BUREAU OF HYGIENE AND TROPICAL DISEASES

TROPICAL DISEASES BULLETIN

Vol. 53] 1956 [No. 12

MALARIA

In this section abstracts are arranged as far as possible in the following order:—Human malaria—*epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control;* Animal malaria—*monkeys, other animals, birds.*

Brumpt, L. C. & de Rocca Serra, J. P. Danger de l'introduction en Corse de nouvelles souches de paludisme et de la bilharziose vésicale. [**Danger of Introducing New Sources of Malaria and Urinary Schistosomiasis into Corsica**] *Bull. Acad. Nat. Méd.* 1956, v. 140, Nos. 21, 22 & 23, 425–6.

The authors point out that although malaria has been eliminated from Corsica by residual spraying, the persistence of anophelines remains a potential danger. Similarly, the existence of *Bulinus contortus* in the coastal riverine area south of the island constitutes a latent menace in regard to schistosomiasis. The introduction of troops from North Africa might result in infection of these vectors. There should therefore be no relaxation of the present measures of malaria control (especially with possible insecticide resistance in mind). Similarly, the exact distribution of the *Bulinus* should be determined and the areas concerned prohibited for possible carriers of schistosomiasis. Urine examination for the detection of ova should be carried out on all soldiers coming from North Africa. *H. J. O'D. Burke-Gaffney*

Chardome, M., Peel, E. & Lambrecht, F. L. La malaria dans le Mutara (Ruanda). [**Malaria in the Mutara Region, Ruanda, Belgian Congo**] *Ann. Soc. Belge de Méd. Trop.* 1956, Apr. 30, v. 36, No. 2, 141–4.

In conjunction with research being carried out on trypanosomiasis transmitted by *Glossina morsitans* and *G. pallidipes* in the region of Mutara (Ruanda) some of the population living along the border of

Glossina-infested country were examined for malaria parasites. Occasional specimens of *Anopheles gambiae* had been found in their huts. Family groups of these people live scattered on the sides of the hills. They are essentially a pastoral people but cultivate small plots of land. Some of them are of recent arrival in the region.

Altogether 151 children and 329 adults were examined. Parasites were found in 35 per cent. of the children and in 41·9 per cent. of the adults. Parasites were often few in number. About 60 per cent. of the positive findings were *P. malariae* infections. Excluding mixed infections 53·37 per cent. were *P. malariae*, 35·58 per cent. *P. falciparum*, and 3·36 per cent. *P. vivax*. *Norman White*

Spencer, T. E. T. **Problems of Malaria in New Guinea.** [Correspondence.] *Med. J. Australia.* 1956, May 5, v. 1, No. 18, 769–70.

The author considers that Dr. Carl Gunther in his paper on "Problems of Malaria in New Guinea" [this *Bulletin*, 1956, v. 53, 1089] has dealt inadequately with the problem of malaria of low endemicity in the highlands of New Guinea. He takes exception to two main statements: he does not agree that invasion of the highland areas by malaria may be slow, or that suppressive drugs cannot be regarded as fully justified for the protection of labour forces. People in the highlands are not immune; malarial endemicity is low, the disease is unstable; there may be long periods of quiescence but epidemics can arise with extreme abruptness. They are particularly favoured by the present trends towards village formation in place of scattered homesteads and the increased migration of the people. The effect of suppressive drugs on the immunity of the people needs little consideration; the immunity is in any case slight and may well be lost during inter-epidemic periods. Suppressive treatment combined with an efficient medical service and prompt treatment of attacks with one of the persistent antimalarials will go a long way towards ultimate control of malaria in the highlands and can be put into action far more readily than a residual spraying campaign of those areas. *G. Macdonald*

Łukasiak, J. Wystepowanie widliszka dziuplowego—*Anopheles plumbeus* Stephens, 1828 (= *nigripes* Staeger, 1839) na ziemiach Polski. [**Occurrence of *Anopheles plumbeus* Stephens, 1828 (= *nigripes* Staeger, 1839) in Poland**] *Wiadomości Parazytologiczne*. Warsaw. 1956, v. 2, No. 4, 227–30, 3 figs. [10 refs.]

The English summary appended to the paper is as follows:—

"In August 1954, at the park of Kudowa Springs (Wrocław district) the author discovered larvae (fourth degree) and pupae of *A. plumbeus* placed in a tree hollow filled with water. This hollow was situated in the ramification of an alder-tree trunk (*Alnus glutinosa*).

"After eleven days rearing the larvae and pupae turned into winged males and females.

"It is characteristic that the occurrence of this mosquito is frequently connected with health resorts (watering places) like Kudova (Poland) where the first *A. plumbeus* was found, and Sochi, Sukhum, Yalta (Soviet Union)."

RAFI, S. M. **Resting Places inside Houses of** *A. culicifacies* **and** *A. stephensi*, **Malaria Vectors of the Punjab.** *Pakistan J. of Health.* 1955, Oct., v. 5, No. 3, 146–54, 3 graphs.

"1. A study to find out the resting habits of the two well-known malaria vectors—*A. culicifaci* and *A. stephensi* was undertaken in the Punjab.

"2. In selected villages catching stations were fixed and adult anophelines mosquitoes were collected from three different height levels, *i.e.*, under three feet, three feet to six feet and above six feet. The study was continued from 1952 to 1955.

"3. The data collected indicated that the vector species rested in uniformity throughout the height of the wall inside the rooms.

"4. In order, therefore, to destroy the malaria vectors as a measure of malaria control it would be advisable to spray the entire surface of the walls inside the house and not to leave any place unsprayed."

JEFFERY, G. M. **Blood Meal Volume in** *Anopheles quadrimaculatus*, *A. albimanus* **and** *Aedes aegypti*. *Exper. Parasit.* New York. 1956, July, v. 5, No. 4, 371–5.

The intake of blood was estimated by weighing gorged females of *Anopheles quadrimaculatus*, *A. albimanus* and *Aëdes aegypti*, due allowance being made for the weight of unfed females. The average intake per mosquito was 3·3 cmm. for *A. quadrimaculatus*, 2·4 cmm. for *A. albimanus* and 2·6 cmm. for *Aëdes aegypti*. Other authors have reported rather smaller volumes [this *Bulletin*, 1938, v. 35, 659; 1953, v. 50, 275]. There is a brief general discussion which emphasizes that comparison of the susceptibility of different species, or strains, of mosquito to malaria parasites should take account of the size of blood meal ingested. *D. S. Bertram*

GRAY, H. F. **The Confusing Epidemiology of Malaria in California.** *Amer. J. Trop. Med. & Hyg.* 1956, May, v. 5, No. 3, 411–18.

At least 4 anophelines are present in California, *Anopheles freeborni*, *A. punctipennis*, *A. franciscanus* and *A. occidentalis*. Malaria was introduced, it is believed, about 1829 and has since then had a very

unstable career marked by severe epidemics, soon after introduction, at the time of the gold rush from 1848 onwards, with the expansion of agriculture and particularly rice-growing from about 1870 onwards, and finally, as a very small but important example, the outbreak in 1952 at a girls' camp near Lake Vera [this *Bulletin*, 1954, v. 51, 454] which was the last epidemic in the U.S.A. It has equally been marked by recessions, the last of which started about 1920 and proceeded to extinction of the disease. *A. freeborni* has generally been held responsible for transmission, its incrimination being largely circumstantial and unsupported by sporozoite findings. On review the author, who has studied this malaria for many years, doubts the validity of this conclusion. The factors which led to epidemics have often been those which led to a multiplication of *A. punctipennis*, while the most profuse multiplication of *A. freeborni* has often been without ill effect; the exclusion of the former from consideration because it usually bites out-doors, in the porch rather than in the house, is unjustified because in hot weather people spent a high proportion of the hours of darkness in the porch. Evidence remains circumstantial but leads the author to believe that *A. punctipennis* may be more important than previously thought; it may have been the principal carrier in some outbreaks, and may have reinforced transmission by *A. freeborni* in the central valley of California in the early days of irrigation. *G. Macdonald*

Vargas, Luis and Martínez Palacios, Amado. Anofelinos mexicanos. Taxonomia y distribución. [**Taxonomy and Distribution of Anophelines in Mexico**] 181 pp., numerous illustrations. 1956. Mexico: Secretaria de Salubridad y Asistencia, Comision Nacional Para la Erradicacion del Paludismo.

This paper repeats the information of a recent previous publication [this *Bulletin*, 1956, v. 53, 401] with additional chapters on the morphology of all stages of anopheline mosquitoes, descriptions of the species of anophelines of Mexico and keys to all stages including eggs and pupae. The maps of the earlier paper are given again and many well-drawn figures illustrate the anatomy and the descriptions.

D. S. Bertram

Amati, G. & Alfano, A. Le variazioni della tiemia da surrenoterapia endovenosa nell'infezione malarica. [**Variations in Blood Sulphur Levels after Intravenous Adrenaline Therapy in Malaria**] *Acta Med. Italica.* 1955, Nov., v. 10, No. 11, 294–6. [10 refs.]

The authors report observations on the sulphur content of the blood in 5 chronic malaria patients submitted to Ascoli's intravenous adrenaline treatment—daily injections of adrenaline in increasing doses of 1/100 to 1/10 mgm. The total sulphur in the blood showed a very slight, scarcely

significant, decline as a result of the treatment, but qualitatively there was a significant change. The oxidized mineral fraction was markedly increased to an approximately normal figure while there was a corresponding diminution in the neutral sulphur component. These changes are indicative of a return to normality of the disorganized metabolism brought about by malaria infection. *Norman White*

VAN SANDE, M. Influence du paludisme sur les protéines sériques étudiées par micro-électrophorèse sur papier. [**Study by Micro-Electrophoresis on Paper of the Influence of Malaria on Serum Proteins**] *Ann. Soc. Belge de Méd. Trop.* 1956, June 30, v. 36, No. 3, 335–43, 1 graph. [20 refs.]

The following is a translation of the author's summary:—

Results of electrophoresis on paper of serum proteins from 47 patients with malaria (12 *P. falciparum*, 14 *P. vivax*, 1 *P. malariae*, 1 *P. schwetzi*, 5 inoculation-infections with *P. vivax* and 14 treated cases) were compared with those in the literature.

An increase of γ-globulins accompanied by a decrease in albumins was observed regularly. The other fractions showed only minimal changes.

[See also this *Bulletin*, 1956, v. 53, 156.] *H. J. O'D. Burke-Gaffney*

ELLIOTT, R. **Bio-Assay Methods for the Estimation of the Insecticide Residues used in Malaria Control.** *West African Med. J.* 1956, June, v. 5 (n.s.), No. 2, 80–87, 1 fig.

Chemical tests for the amount of DDT, BHC, or dieldrin present on surfaces sprayed for residual effects are not generally practicable unless facilities of a chemical laboratory are available. This paper describes a bio-assay method developed during malaria control schemes in Nigeria [this *Bulletin*, 1956, v. 53, 21]. A steel paint scraper was used to remove the wall surface within an area of 3 in. × 3 in. cut in a tin stencil. [The depth of scraping is not stated.] Samples were treated with several washes of acetone to extract the insecticide; other non-toxic substances were also extracted, some of which would interfere with colorimetric assay. Extraction through a filter funnel on filter paper is satisfactory, though a Soxhlet apparatus would be better. The biological material used was first stage larvae of *Aëdes aegypti* and batches of about 20 were introduced into a series of small glass tubes of about 4 ml. capacity containing different aqueous dilutions of the extracted insecticide. The mortality over 24 hours was observed and compared with a dosage-mortality curve derived from standard dilutions of the insecticide in question, from which could then be read the concentration of the insecticide in the unknown sample. Tables show reasonable agreement in results by this bio-assay method and chemical analysis for both DDT and dieldrin. *D. S. Bertram*

Bruce-Chwatt, L. J. **Problems of Insecticide Resistance in relation to Malaria Control in Africa.** *West African Med. J.* 1956, June, v. 5 (n.s.), No. 2, 47–54. [12 refs.]

This is a general article drawing attention to the increase in the number of species of mosquito which have developed resistance to DDT and, in one case, to dieldrin. Some account is given of genetic principles involved. Resistance of mosquitoes to insecticides must now be seen as a threat to the success of malaria control throughout the world. The World Health Organization has been active in reviewing the scope of research devoted to the problem and finds that the amount of effort in this field is extremely limited. It is implementing a programme to encourage more intensive research on the physiology, biochemistry, genetics, and ecology of resistance in insect vectors, with close coordination of the workers and the laboratories concerned. *D. S. Bertram*

Leshchenko, P. D. **The Elimination of Malaria in the Ukrainian Soviet Socialist Republic.** *Roy. Soc. Promotion Health J.* 1956, Sept., v. 76, No. 9, 645–6.

This paper, by the Vice-Minister of Health, Ukrainian S.S.R., is one of a series of short addresses read at the Overseas Forum at the Royal Society of Health Congress at Blackpool in April 1956.

Before the Revolution, the author states, there were more than 650,000 cases of malaria annually in the Ukraine. During the first World War and the subsequent civil war, widespread epidemics throughout the country threatened the health and development of the Ukraine. The control of malaria became an urgent national problem and from the earliest days the Soviet authorities planned antimalarial measures to be undertaken not only by the public health departments, but by industry, public bodies and the people themselves.

A network of specialized antimalarial stations, numbering 285, was established in affected areas and very large sums of money were allocated to malaria control. " Hydrotechnical anti-malarial works " were set up, including minor units within 3-kilometre zones of populated areas, to destroy mosquito-breeding over an area of nearly 500,000 acres: in addition, reservoirs where mosquitoes bred were sprayed with larvicide from the air over an area of 200,000 acres. At one period, shortage of quinine hampered the work. From 1933–35 the Soviet Union was provided with home-produced antimalarials (akrikhin and akrikhin with plasmocide [pamaquin]). By 1940, the incidence of malaria had been reduced to 63 cases per 10,000, compared with 329 in 1924.

During the occupation of the Ukraine in the second World War, the familiar wartime conditions and those arising from invasion led to a sharp rise in the incidence of malaria, which increased 2½ times: in 1945 it had reached 175 cases per 10,000 and in some areas rose to 2,000 per 10,000.

After the War, the anti-malaria network was restored and the number of stations increased to 348. The sharp rise in incidence was checked in 1945 at 175 cases per 10,000. In the postwar years 1945–1952 elimination of malaria as a mass disease was nearly complete: in 1955, only 118 cases were registered in the whole of the Ukraine.

The main method of attack was by mass diagnosis and treatment in dispensaries; this was applied to 6 million people yearly. It involved some 45,000 doctors and more than 300,000 medical assistants, strengthened by 10,000 workers, placed at the disposal of the public health service by industry, state and collective farms, to distribute drugs and carry out larvicidal spraying.

The author ends by pointing out that the problem now remains of creating conditions which will eliminate malaria completely. Anti-malarial measures are now part of the national economic plan.

H. J. O'D. Burke-Gaffney

Narahari Rao, C. S. & Bhombore, S. R. **A Survey of the Economic Status of Villages in a Malarious Tract in Mysore State (India) after Residual Insecticidal Spraying.** *Bull. Nat. Soc. India for Malaria & other Mosquito-Borne Dis.* 1956, May, v. 4, No. 3, 71–7.

The authors analyse the rice yields, from 1946 to 1954, in a part of Mysore which was highly malarious, and where malaria was brought under control by work starting in 1949–50 which immediately reduced the infant parasite rate from 54 per cent. to zero and more slowly reduced the spleen rate from 45 to 0·7 per cent. Changes in agricultural habit in this time are noted. The acreage under rice increased by 15 per cent., the yield per acre by 15 per cent. and the gross additional yield amounted to 33 per cent. of the original. Deductions are made from these figures and attributed to the use of improved seed and fertilizers but account for no more than 2 per cent. of the increase. The net excess yield is estimated to have been worth 2·3 million rupees, which amounts to over Rs. 21 (£1/11/6) in the *per caput* income of the area. The annual cost of malaria control is Rs. 26,620. It is concluded that the direct financial advantage of malaria control amounts to 87 times its cost, and both direct and indirect advantages to 97 times the cost. *G. Macdonald*

Chakrabarti, A. K. **Malaria Control—a Vital Element in a Mass Drive for Food Production. Part III.** *Bull. Nat. Soc. India for Malaria & other Mosquito-Borne Dis.* 1956, Mar., v. 4, No. 2, 53–8.

The importance of the Terai area in food production, and the epidemiology and history of the malaria which has prevented its development, have been previously described [this *Bulletin*, 1955, v. 52, 1162]. Malaria control was started in 1947, first by combined chemoprophylaxis and residual spraying with DDT and afterwards by the latter alone. The

author describes the organization deployed and more briefly the methods and results. Extensive settlement has been carried out in previously almost uninhabitable areas, and land once uncultivated has been brought into production. *G. Macdonald*

Resseler, R. Un nouveau plasmodium de rat en Belgique: *Plasmodium inopinatum* n. sp. [**A New** *Plasmodium* **of the Rat in Belgium:** *Plasmodium inopinatum* **n.sp.**] *Ann. Soc. Belge de Méd. Trop.* 1956, June 30, v. 36, No. 3, 259–63, 1 coloured pl.

A rat was caught on May 2, 1956, in a swampy region near Lierre in Belgium not far from the junction of the Albert Canal with the Nèthe. Its blood showed *Trypanosoma lewisi* and after splenectomy on May 4 these parasites increased in number, while on May 9 a malaria parasite appeared as well in a low density. Gametocytes were numerous but asexual stages were also present. Two splenectomized white rats were immediately inoculated with the blood of the wild rat and these first showed parasites 13 days later. White mice were inoculated, and they died with a heavy parasitaemia in 7 to 11 days. *Thamnomys*, *Steatomys* and hamsters were also found to be susceptible.

The youngest parasites are ring forms 2·5 to 3 μ in diameter, with a large nucleus nearly always undivided. From the third day of the infection, multiple invasion of erythrocytes is frequent, and such corpuscles become much enlarged and sometimes show a coarse stippling. The parasite does not show any predilection for reticulocytes until late in the infection. There is little amoeboid movement. Pigment in fine black dots appears, and finally becomes condensed in the centre of the schizont. The mature schizont possesses 10–12 merozoites. Gametocytes are round or oval and are 5·5–6·5 μ in diameter. Extracellular parasites are numerous and may reach 10–20 per cent. of the total number. The duration of schizogony is probably 24 hours.

Two other malaria parasites of rodents are known, *P. vinckei* and *P. berghei*. This parasite differs markedly from the former but less from the latter. However, in several respects it is different from *P. berghei* and the author names it *P. inopinatum*.

[The two known species of rodent *Plasmodium* are confined to West Africa. This discovery may prove of great importance, because the problems of mosquito transmission (hitherto so difficult in the African species) may be simple with our European *Anopheles*. A good coloured plate shows the similarity of this parasite to *P. berghei*, and it would seem advisable (a) to verify the absence of cross-immunity with this species and (b) make other isolations from splenectomized wild rats in Belgium.] *P. C. C. Garnham*

TRYPANOSOMIASIS

In this section abstracts are arranged as far as possible in the following order:—African—*human, animal;* American—*Chagas's disease and other trypanosome infections. In each form the following order is followed:*—*epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.*

NIGERIA, NORTHERN. Med. Dept. **Sleeping Sickness Service Annual Report, April 1st, 1955—31st December, 1955.** 18 mimeographed pp., 2 folding maps. 1956.

Owing to the adoption of the calendar year instead of the financial year this Report covers a period of only 9 months. On several counts it is of more than usual interest.

The incidence of human trypanosomiasis was very slightly raised as compared with the previous year. Nearly 40 per cent. of cases detected at medical centres were late clinical or relapse infections, while 90 per cent. of the cases found on resurvey were early and relatively symptomless. In Bauchi Province an epidemic causing a three-fold increase in incidence was detected in the search for a few patients who had failed to complete treatment. It had started a year and a half previously and the only associated factor was an increase in tsetse numbers during the previous few years. Both these observations indicate the failure of static treatment centres to control sleeping sickness and the necessity for actively seeking cases.

The Tsetse Control Section between 1938 and 1949 had provided numerous clearings at points of close fly-man contact. Owing to shifting cultivation and the burden of upkeep the policy was changed in 1948 to that of clearing whole river systems. Between 1950 and 1955 2,400 miles of river bank were cleared in an area of 2,500 square miles between Zaria and Malumfashi, the original clearing being done by paid labour and the reslashing by communal labour. The task of supervising reslashing became impossible and the present policy is to survey the cleared area and then divide it into blocks which will be protected by barrier clearings reslashed annually by paid labour.

During the last 5 years it has not been found possible to reduce the very low incidence of sleeping sickness below 0·2 per cent. by the intensive application of control measures. In the endemic area inhabited by 10 million people there is on average a mile of fly-infested river for every one of its 2,500 square miles. It would appear that the disease will not be eliminated until fly control is effective in all the major endemic foci. For this reason research into improved methods of fly control has been pursued during the last 2 years.

Further work on the application of insecticides to vegetation has been carried on in Benue Province. A considerable reduction in fly has resulted from 4 applications of 20 lb. of DDT (100 per cent.) per mile in

a 2½ per cent. suspension. Encouraging results have been obtained after a few further applications. It is proposed to attempt insecticidal treatment of sections of river systems with clearance between sections.

Completion of control over a 12-mile stretch of river by means of Nash's method of obstructive clearing has shown a cost of £34 per mile compared with £60 to £70 for ordinary clearance. Tsetse movement still occurred since fly was found in the area throughout the year. It will now be isolated by barrier clearings to determine whether fly can live and breed in this type of clearing.

The Report ends with 2 maps and a series of appendices giving statistics collected during the period. *T. H. Davey*

Gallais, P., Collomb, H. & Miletto, G. A encefalite da tripanosomíase africana a " T. gambiense ". (Síntese clínica, biológica, anatómica e electro-encefalográfica). [**Encephalitis in Trypanosomiasis due to** *Trypanosoma gambiense*] *Anais Inst. Med. Trop.* Lisbon. 1956, Mar.–June, v. 13, Nos. 1/2, 59–68. English summary (9 lines).

Chihara, H. **Susceptibility of the Albino Rat to Infection with** *Trypanosoma lewisi*, **with especial reference to a " New Method " of foreknowing the Resistance of the Individual Host.** *Kobe J. Med. Sci.* 1956, July, v. 2, No. 3, 633–69, 1 fig. [58 refs.]

de Aragão, J. M. B., Aguirre, G. H., Leal, J. M. & Serafim, E. Contribuição ao conhecimento da distribuição geográfica dos triatomíneos domiciliários e seus índices de infecção natural por *Schizotrypanum cruzi*, no Estado da Bahia. [**The Geographical Distribution and Indices of Infection with** *Trypanosoma cruzi* **of Triatominae in Houses in the State of Bahia**] *Rev. Brasileira Malariologia.* Rio de Janeiro. 1955, Oct., v. 7, No. 4, 409–21.

The English summary appended to the paper is as follows:—

" The authors carried out a survey of Triatomidae in 72 counties of the state of Bahia and 4 in the state of Pernambuco, and determined the indices of natural infection of the species found. Out of 1,929 localities inspected, Triatomidae were found in 1,030. The feces of 6,525 Triatomidae were examined, in 1,241 of them *Schyzotrypanum cruzi* having been found, thus giving an index of natural infection of 19·02 per cent. The species found were *Panstrongylus megistus*, *Triatoma sordida*, *T. brasiliensis* and *T. infestans*, the first two being the predominant species."

Mayer, H. F. & Alcaraz, I. L. Estudios relacionados con las fuentes alimentarias de *Triatoma infestans* (Hem., Reduviidae). [**Studies on the Food Sources of** *Triatoma infestans*] *An. Inst. Med. Regional.* Tucuman, Argentina. 1955, Dec., v. 4, No. 2, 195–201. English summary.

Using antisera of high specific titre for man and various domestic animals, the authors made an analysis of the blood meals of 453 *Triatoma infestans* collected from the environs of 96 houses on the outskirts of the city of Resistencia. The triatomids comprised 251 (55·04 per cent.) adults and 202 (44·96 per cent.) nymphs, and their associated vertebrate hosts (average number per house in brackets) were 468 human beings (4·8), 115 dogs (1·1), 79 cats (0·75) and 310 chickens (3·2).

Analysis showed that various proportions of triatomids had fed on all possible combinations of the available hosts, but that the large majority had been confined to one or two of them. The most frequent single host was man. Total positive reactions for each host were man 348, dog 104, cat 66, chicken 117. However, by correlation with the numbers of each host, the authors consider that their importance as food sources for *T. infestans* decreases in the order dog, cat, man, chicken. *N. R. Phillips*

Baines, S. **The Role of the Symbiotic Bacteria in the Nutrition of** *Rhodnius prolixus* **(Hemiptera).** *J. Exper. Biol.* 1956, Sept., v. 33, No. 3, 533–41. [15 refs.]

LEISHMANIASIS

In this section abstracts are arranged as far as possible in the following order:—visceral, cutaneous, muco-cutaneous.

Guillén Alvarez, G. Cuatro primeros casos de kala azar descubiertos en El Salvador. [**The First Four Cases of Kala Azar recorded in El Salvador**] *Archivos Colegio Med. de El Salvador.* 1954, Sept., v. 7, No. 3, 238–45, 4 figs.

Ho, E. A. & T'Ao, C. Y. **Further Report on Evaluation of Sodium Antimony Gluconate in Mass Treatment of Kala-Azar by the Rate of Disappearance of Leishman-Donovan Bodies.** *Chinese Med. J.* Peking. 1955, July–Aug., v. 73, No. 4, 293–306.

The technique used in this study was similar to that used in an earlier study [this *Bulletin*, 1954, v. 51, 42]. The diagnosis was established by

sternal puncture smear and the cure was judged by the results of subsequent sternal punctures at intervals, after the second, fourth and sixth injection of the drug or until leishmaniae had disappeared. Six products were tested in 607 cases (including 127 reported previously). In each series a similar pattern of age-grouping was observed. The drugs used were all preparations of sodium antimony gluconate (SAG); they included Sticon, Glucotan, Solustisin, Huatung SAG, Hanli SAG and Pentostam. Several different dosage schemes were observed and the results are reported under each scheme and according to whether the China-made product or the British Pentostam was used.

1. The drugs were given twice a week and the dosage was adjusted to 33·3 mgm. Sb. per kgm. per injection. There were 248 patients treated by the Chinese product; of these 233 completed the required course, 4 died, 7 could not be traced and 4 recovered although they had not completed the course. The percentage immediate cure rate was 95·5. In the 233 patients completing the required course leishmaniae had disappeared from the sternal puncture smears in 89·3 per cent. after the fourth injection and in 98·7 per cent. after the sixth injection. Of 125 patients treated with Pentostam, 119 completed the required course; in 82·5 per cent. leishmaniae disappeared after the fourth injection and 97·5 after the sixth injection. Of those not completing the required course, 2 were completely cured, 1 died and 3 were untraced; the immediate cure rate was thus 96·8 per cent.

2. The drugs were given thrice weekly and adjusted to 33·3 mgm. per kgm. per injection. With Chinese product, Sticon and Hanli SAG, 79 patients were treated, of whom 74 (93·7 per cent.) completed the course and recovered, 1 died and the fate of 4 was unknown. After the fourth injection 66·2 per cent. were negative and after the sixth injection 97·3 per cent.

3. Intravenous injections of Sticon adjusted to 25 mgm. per kgm. per injection were given to 22 patients. The parasites disappeared in 70 per cent. after 4 injections and in 95·0 per cent. after 6 injections.

4. Intramuscular injections (33·3 mgm. Sb. per kgm.) were given to 133 patients of whom 113 completed the course of treatment with Sticon, Huatung SAG or Pentostam. Of these 89·5 per cent. were cured. The rate of disappearance of the parasites was 88·8 per cent. and 94·5 per cent. after the fourth and sixth injections, respectively, with Sticon, and 82·2 and 87·5 per cent. with Pentostam.

The toxicity of the drugs is not important. A few patients, especially when injections were given thrice weekly, showed oedema and albuminuria; 17 to 18 per cent. were thus affected, but with a change to injections twice weekly the symptoms disappeared.

A little over half the patients (57·4 per cent.) returned to the clinic for follow-up examinations, but follow-up visits to villages confirmed that most of the patients had remained well and showed no evidence of relapse.

[The report indicates that sodium antimony gluconate is a drug of great value in the treatment of kala azar in the dosage used, that there is little difference between the Chinese preparations and Pentostam, with not unnaturally a slight balance in favour of the Chinese product, that Chinese patients do not tolerate the more concentrated courses well, and that major toxic effects are rare and minor toxic effects not important whether Pentostam or Chinese products are used, but it is not quite clear that all the Chinese brands are equally innocuous.] *L. E. Napier*

Delatte, P. Sur un case de bouton d'Orient constantinois. [**A Case of Oriental Sore in Constantine, Algeria**] *Arch. Inst. Pasteur d'Algérie.* 1956, June, v. 34, No. 2, 221–2.

[See this *Bulletin*, 1946, v. 43, 1127; 1955, v. 52, 260.]

Doury, P. A propos de deux nouveaux cas autochtones de bouton d'Orient observés au Hoggar (Sahara central). [**Two New Autochthonous Cases of Oriental Sore at Hoggar (Central Sahara)**] *Arch. Inst. Pasteur d'Algérie.* 1956, June, v. 34, No. 2, 218–20.

Pestre, A. Manifestations oculaires de la leishmaniose cutanée (Bouton d'Orient). [**Ocular Manifestations of Cutaneous Leishmaniasis**] *Algérie Méd.* 1955, Sept., v. 59, No. 9, 589–97, 6 figs.

The author has considerable experience of cutaneous leishmaniasis in Algeria. He analyses the cases which have passed through his hands, and emphasizes that primary ocular involvement is uncommon, but that when the infection involves the neighbourhood of the eyelids and lachrymal sac region, secondary infection with pyogenic organisms cannot be avoided, and may cause ulcerative changes of the eye itself. These changes can be very destructive and lead to trichiasis, corneal scarring, and possible corneal perforation, all of which lead to considerable visual loss.

The condition is readily diagnosed from other conditions with which it might be confused by pathological examination, following which treatment can be given which is usually highly successful. As this infection is very common in that part of Africa, he stresses the necessity for routine pathological examination of all suspicious lesions around the eyes

D. P. Choyce

FEVERS OF THE TYPHUS GROUP

In this section abstracts are arranged as far as possible in the following order:—general; louse-borne typhus, flea-borne typhus, mite-borne typhus; rickettsialpox; tick-borne typhus; Q fever, other rickettsial diseases.

Kostrzewski, J. Epidemiologia sporadycznego duru wysypkowego w Polsce w latach 1952–1954. [**Epidemiology of Sporadic Typhus in Poland in 1952–1954**] *Przeglad Epidemiol.* Warsaw. 1956, v. 10, No. 1, 1–17, 7 figs. [67 refs.] English summary.

Between 1952 and 1954, 768 sporadic cases of typhus were observed in Poland, 304 (39·6 per cent.) of which were second infections. The cases have been classified into 3 groups, according to whether the source of infection was established, probably established or could not be traced. The proportion of cases in the third group rose during the period and attained 70·8 per cent. of all cases in 1954; a corresponding rise in the number of second infections was also seen, and in 95·1 per cent. of these cases no external source of infection could be traced. The usual seasonal incidence was seen in the first 2 groups, but the maximum incidence in group 3 occurred in the summer. In the first group 71 per cent. of patients were below 30 years of age, whereas 73 per cent. of those undergoing second infections were over 40; 86 per cent. of patients in the first group lived in the country, and 64 per cent. of second infections occurred in town-dwellers. Low titres or negative results in the Weil-Felix reaction were commonly found in second infections, and also in the third group. The time elapsing between the second and original infection showed 2 peaks, between 8 and 14 years, and between 30 and 40 years, respectively; the first peak contained 35 per cent. of cases and corresponded to the last war, and the second peak, comprising 60 per cent. of cases, corresponded to the 1914–18 war. Intervals up to 52 years were observed. *D. J. Bauer*

Kryński, S. **The Weigl's Test—a New Method of investigating the Toxicity of Chemotherapeutics.** *Bull. State Inst. Marine & Trop. Med. Gdańsk, Poland.* 1956, v. 7, 140–44. [Also in Polish 131–6, 3 figs. (21 refs.) & Russian 136–40.]

The intrarectal infection of lice with *Rickettsia prowazeki* has been used as a means of determining the toxicity of antibiotics and similar chemotherapeutic substances. Groups of 50 to 100 lice 12 to 14 days old are maintained at 34°C. and inoculated intrarectally with 0·7–0·8 mgm. of a solution of the test substance. The lice are fed after an interval of at least 2 hours, and then every 24 hours over a period of 5 days. The mortality in the group is then recorded, and the result is expressed as the LD50 per kgm. of body weight. Examples are given of the use of the method in the examination of streptomycin, tetaine and cereine (antibiotics from strains of *Bacillus*), and other substances. *D. J. Bauer*

Bozeman, F. Marilyn, Hopps, Hope E., Danauskas, J. X., Jackson, Elizabeth B. & Smadel, J. E. **Study on the Growth of Rickettsiae. I. A Tissue Culture System for Quantitative Estimations of** *Rickettsia tsutsugamushi*. *J. Immunology*. 1956, June, v. 76, No. 6, 475–88, 3 figs. [30 refs.]

Roller-tube cultures of mouse lymphosarcoma cells (MB III strain) supported the growth of egg-adapted lines of *Rickettsia tsutsugamushi*, *R. prowazeki*, *R. mooseri*, *R. rickettsi* and *R. burneti*. In these cultures, *R. tsutsugamushi* increased about 3-fold in 24 hours at 37°C. Cultures of *R. tsutsugamushi* treated with chloramphenicol showed a sharp decrease in infective titre (from $10^{-6.7}$ to $10^{-2.5}$ mouse LD50 in 24 hours); no organisms were recognizable in 82 per cent. of cells at 24 hours, although nearly 100 per cent. contained rickettsiae when the drug was added. No significant changes in oxygen uptake or anaerobic glycolysis were demonstrable in cultures infected with *R. tsutsugamushi*. This culture system may enable rickettsial synthesis to be investigated by inhibitor analysis techniques. *R. S. F. Hennessey*

Le Gac, P., Giroud, P., Roger, F., Courmes, E. & Bres, P. Étude de quatre souches de *Rickettsia orientalis* isolées au cours des opérations militaires au Vietnam. [**Study of Four Strains of** *R. tsutsugamushi* **isolated in Vietnam**] *Bull. Soc. Path. Exot.* 1956, Mar.–Apr., v. 49, No. 2, 338–45.

This paper gives details of the pathogenic properties of 4 strains of *Rickettsia orientalis* [tsutsugamushi] from Vietnam, as seen in the mouse and guineapig. Strains O14 (from South Annam), D16 and G16 (both from Cochin-China) produced typical signs of tsutsugamushi infection in both species, rickettsiae being detectable in the exudates following intraperitoneal inoculation. Mice inoculated by the intranasal route developed pneumonia after an incubation period which was seldom less than 20 days. Strain F16 (from Cochin-China) differed from the other 3 by failing to become adapted readily to mice. All 4 strains showed cross-immunity among themselves but not with a strain of rickettsia from boutonneuse fever. *R. S. F. Hennessey*

Brezina, R. & Táborská, D. Výskum Q horúčky na Slovensku. II. zdelenie: Sporadické prípady choroby a další výskum rezervoárových zvierat. [**Research on Q Fever in Slovakia. 2nd Report: Sporadic Cases and further Investigation of Reservoir Animals**] *Československ. Epidemiol., Mikrobiol. Imunol.* Prague. 1956, v. 5, No. 3, 152–5. [12 refs.] English summary (9 lines).

In 1954–55 the Q fever complement-fixation test with an antigen consisting of a suspension of *Rickettsia burneti* extracted with ether was

carried out on sera from 373 persons resident in Slovakia who were suspected of suffering from the disease on clinical grounds. Positive results were obtained with 41 persons (11 per cent.), who mostly worked in contact with domestic animals; the incidence of infection was higher in persons living in the southern and south-western parts of the country. Most cases were of pneumonic or pyrexial type; 2 patients had an exanthem and 1 suffered from meningoencephalitis. In the examination of the sera of 145 animals from epidemic areas specific antibody was found in 3 of 5 deer, 2 of 19 hares, 4 foxes, 14 of 40 rats, 2 of 20 house mice and 3 of 15 shrews. *D. J. Bauer*

YELLOW FEVER

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.

Porterfield, J. S. **Further Studies on the Yellow Fever Haemagglutination Test.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1956, July, v. 50, No. 4, 344–53, 4 figs.

The author gives details of a survey in which 374 human sera collected in 7 widely separated areas in the Gold Coast were tested in parallel by the mouse protection test and the haemagglutination-inhibition (HAI) test for antibodies to yellow fever virus. There was complete agreement between the results of the tests in 91 per cent. of 230 sera from 4 areas (3 in the southern part of the territory), the percentage of agreement for each area varying from 87 to 93. Agreement was less significant in the other 3 areas (53, 66 and 72 per cent.); sera from 2 of these areas (in the northern part of the territory) showed increasing HAI titres with advancing age of subjects. A possible explanation is that an agent or agents serologically related to yellow fever virus may produce antibody which cross-reacts with yellow fever antigen in HAI tests. It is thought that the results obtained in the southern regions of the Gold Coast justify the use of the HAI test as an indication of yellow fever immunity levels in the population; elsewhere, positive HAI test results should be checked by protection tests on, say, every 5th serum from adults and possibly all sera from children. *R. S. F. Hennessey*

DENGUE AND ALLIED FEVERS

Anderson, C. R., Downs, W. G. & Hill, A. E. **Isolation of Dengue Virus from a Human Being in Trinidad.** *Science.* 1956, Aug. 3, v. 124, 224–5.

A filterable agent lethal for young mice was isolated by intracerebral inoculation of 4-day-old mice with blood from a girl resident in Port-of-Spain, Trinidad, who had been suffering for 4 days from a condition diagnosed clinically as dengue fever. On continued passage, the incubation period in 1-day-old mice became fixed at 5–6 days, mice dying in a day or two from the onset of illness. Serum obtained from the patient during convalescence neutralized about 1,000 times more virus than serum taken during the acute stage of the disease. The agent was eventually adapted to adult mice by passage in mice of increasing ages. Cross-neutralization tests with sera from immune rhesus monkeys indicated an immunological relationship between the Trinidad virus and strains of dengue-1 and dengue-2 viruses, with some suggestion of a closer relationship to the dengue-2 strain. Although dengue fever has been diagnosed clinically in Trinidad on previous occasions, this appears to be the first record of the isolation of a virus related to dengue virus from a resident of Trinidad who was suffering from a clinically typical attack of the disease. *R. S. F. Hennessey*

Caubet, P., Beisseige, H., Netter, R. & Carloz, L. Diagnostic de la dengue à Saigon. [**Diagnosis of Dengue in Saigon**] *Bull. Soc. Path. Exot.* 1956, Mar.–Apr., v. 49, No. 2, 345–53, 1 fig.

Dengue occurring in sailors in Indo-China was well described by Vassal and Brochet in 1909. In 1953 Cluzel and Roux [this *Bulletin*, 1954, v. 51, 910] described as an outbreak of a new rickettsial disease a febrile disorder which occurred in the military barracks of Saigon. This illness closely resembled dengue, but it was stated that Prof. P. Giroud had reported that sera from patients showed satisfactory titres to rickettsial suspensions and gave positive complement-fixation tests for boutonneuse fever.

The present authors investigated a febrile disorder accompanied by an exanthem which occurred in troops in Saigon in 1955 and conclude that the illness was dengue. The fever showed a characteristic saddleback temperature record and was accompanied by a macular rash not involving the palms or soles. Sera were negative when tested against suspensions of *Proteus OX19, OXK* and *OX2* and against suspensions of *Rickettsia* (Prof. Giroud). Only one guineapig was inoculated; no infection resulted. No clinical response was obtained with antibiotics but severe cases were dramatically relieved by cortisone. An attempt to transmit the disease through *Aëdes* to 3 volunteers gave suggestive but indefinite results. The

authors conclude that dengue undoubtedly occurs in Saigon and note that rickettsiae were not recovered by guineapig inoculation by Cluzel and Roux.

[This report casts further doubt on the validity of the new rickettsial disease described by Cluzel and Roux.] *Frederick J. Wright*

RABIES

Nikolić, M. & Jelesić, Z. **Isolation of Rabies Virus from Insectivorous Bats in Yugoslavia. A Preliminary Report.** *Bull. World Health Organization.* Geneva. 1956, v. 14, No. 4, 801–4.

During the past few years cases of atypical rabies, in which the source of infection could not be established, have been reported among herds of cattle in Yugoslavia. In view of the atypical clinical picture and the unexplained mode of virus transmission, the authors investigated the possibility of an association between the local bats and these rabies outbreaks. The results of their investigation are provided in this preliminary report.

From bats of 6 different species collected in the Vojvodina district the brains were removed and subjected to the biological diagnostic test. White mice were inoculated intracerebrally with 0·03 ml. of a 1 in 10 brain suspension containing penicillin and streptomycin, a test of bacteriological sterility being performed at the same time. From 3 out of 27 insectivorous bats of the *Nyctalus noctula* species, which on capture had shown no signs of illness, a pathogenic agent was isolated.

Intracerebral inoculation of brain suspensions from each of these 3 bats produced in mice typical rabies infections after an incubation period, which in the first passage lasted 6–10 days, but in subsequent passages became increasingly shorter until from the seventh passage onward it remained fixed at 5 days; duration of illness rarely exceeded 36 hours; the LD50 was about 10^{-5}. In rabbits inoculated intracerebrally with a brain suspension from the second mouse passage the incubation period lasted 3½–4 days and remained unchanged in 20 subsequent passages; death occurred 1½–2 days after the onset of illness; in these animals obvious signs of paralysis were not seen, but in other rabbits infected by the intramuscular route with a suspension of brain from the first or third rabbit passage paralysis of both hind legs developed on the second day of illness. In guineapigs inoculated intracerebrally with a brain suspension from the second mouse passage the incubation period was 3–3½ days.

Microscopic examination of impression smears of Ammon's horns stained by Sellers's method was regularly carried out, but in no instance were Negri bodies found. Histopathological investigation of 250 sections

revealed the presence of encephalitic lesions in every case, but sections of Ammon's horns, stained by Lentz's method, although containing numerous intracytoplasmic and extracellular homogeneous dark-blue bodies, 1–3 μ in diameter, showed no evidence of Negri bodies.

The rabic nature of the pathogenic agent isolated from the bats' brains was, however, confirmed by the results of neutralization and serum-protection tests: in the former the anti-rabies serum neutralized serial ten-fold dilutions of 10^{-2} to 10^{-4} of the bat virus—dilutions which killed all the control mice not receiving the specific serum; in the latter, in which 3 intraperitoneal injections, each of 0·5 ml., of anti-rabies serum were given on 3 successive days, followed by intracerebral challenge with from 10^{-1} to 10^{-5} dilution of the bat virus, " the mice which received serum were protected through the 10^{-4} dilution of the bat virus, and the control mice receiving virus alone died ". *G. Stuart*

Vieuchange, J., Vialat, C., Gruest, J. & Béquignon, R. Essais de culture *in vitro* du virus rabique des rues. [**Attempts to cultivate Street Rabies Virus** *in vitro*] *Ann. Inst. Pasteur.* 1956, Mar., v. 90, No. 3, 361–3.

Roller tube cultures of embryonic mouse brain tissue were infected with an unfixed strain of rabies virus which had undergone 4 passages in rabbits since isolation, and the presence of virus in the supernatant fluid was determined at intervals by the intracerebral or intramuscular inoculation of rabbits. Virus was detected after 5 days of incubation and again after 26 days, but not in samples removed after 19 and 34 days. In similar experiments with cultures of adult rabbit cornea and sclera virus was detected after 19 days, but was not present in samples removed after 5, 26 and 34 days. No virus could be detected at any time in cultures of embryonic guineapig kidney and embryonic chick brain.

D. J. Bauer

Yaoi, H. & Maeda, H. **Studies on the Rabies Vaccine. XIIIth Report: On the Glycerinated Merzonin Vaccine.** *Yokohama Med. Bull.* 1955, Dec., v. 6, No. 6, 359–74. [27 refs.]

Ordinary Merzonin vaccine is prepared from brain suspensions of fixed rabies virus inactivated by the combined action of Merzonin (0·1 per cent.) and heat (37°C.) over a 5-day period. For the preparation of glycerinated Merzonin vaccine glycerol, in a concentration of 20 per cent. (proved to be the optimum), was also added to the virus suspensions, with the result that inactivation had to proceed for 7 days at 37°C. in order to ensure the absence of live virus from the vaccine. The addition of glycerol, although prolonging the time required for inactivation, had the effect, as evidenced by the results of immunization experiments on

Swiss mice, of increasing the antigenic potency of the vaccine. Thus the MLD protective value of glycerinated Merzonin vaccine was shown to be superior to that of ordinary Merzonin vaccine, of glycerinated phenolized vaccine, or of ultraviolet irradiated vaccine.

Glycerinated Merzonin vaccine also proved to be more resistant than ordinary Merzonin vaccine to extremes of temperature: after exposure to −10°C. and to 43°C. for 10 days the former, with an original potency of 1,820,000 (determined by the Habel test), showed potencies of 1,479,000 and 4,169, respectively, while the latter, with an original potency of 1,230,000, showed potencies of only 467,700 and 575, respectively. In this connexion it is noteworthy, however, that ordinary Merzonin vaccine, which had previously been shown to maintain its original potency unaltered after one year's storage at 4°C., has now been found to retain after 3 years' storage at that temperature sufficient antigenicity to make it serviceable for immunization.

Finally in this paper a case of neuroparalytic accident, with fatal outcome, is reported in a 54-year-old man, who in 1952 had received 10 successive intradermal injections, each of 0·2 ml., of 10 per cent. ordinary Merzonin vaccine. This was the first complication of this nature among 3,000 persons so treated. Recently the intradermal administration of Merzonin vaccine has been completed in 4 or 7 days, by injecting 0·1 ml. or 0·2 ml. once or twice daily to make a total of 7 doses. Among 26 persons so treated there has been no death or paralytic accident.

G. Stuart

Atanasiu, P., Bahmanyar, M., Baltazard, M., Fox, J. P., Habel, K., Kaplan, M. M., Kissling, R. E., Komarov, A., Koprowski, H., Lépine, P., Pérez Gallardo, F. & Schaeffer, M. **Rabies Neutralizing Antibody Response to Different Schedules of Serum and Vaccine Inoculations in Non-Exposed Persons.** *Bull. World Health Organization.* Geneva. 1956, v. 14, No. 4, 593–611. [30 refs.]

Although the presence of specific neutralizing antibody in human sera during or after anti-rabies treatment is only indirect evidence of immunity to rabies, it is still the sole available experimental evaluation that can be carried out in man. In order, therefore, to evaluate on this basis the effectiveness of different forms of treatment, the presence of serum antibody at varying periods of time up to the 28th day after the start of immunization was tested in groups of normal adult persons, previously unexposed to rabies and without history of previous anti-rabies vaccination.

Eleven groups of 10 persons each were inoculated with one or other of the following preparations: hyperimmune serum alone (0·5 ml. per kgm. of body weight; potency approximately that of the International Standard Anti-Rabies Serum); phenolized inactivated vaccine (20 per cent. nervous

tissue suspension; LD50 protection value 70,470) in a single dose of 3·5 ml., or in 7 or 12 daily doses of 0·5 ml.; chicken-embryo (Flury) vaccine (70 per cent. tissue suspension) in a single dose of 3·0 ml.; or combinations of these same preparations: hyperimmune serum plus phenolized vaccine: vaccine given in a single dose of 3·5 ml. 7 days after the serum inoculation, or in 7 or 12 daily doses of 0·5 ml. begun 24 hours after the serum inoculation, or in 7 daily doses of 0·5 ml. begun 7 days after the serum inoculation; or hyperimmune serum plus Flury vaccine: vaccine given in a single dose of 3·0 ml. 24 hours or 7 days after the serum inoculation.

Qualitative and quantitative determinations of neutralizing antibody in the blood, in response to the above passive and active immunization procedures, showed, *inter alia*, that only in the group receiving serum, followed 24 hours later by a course of 12 daily doses of phenolized vaccine, was the continuous presence of antibody demonstrable over the entire period of the 28-day test. Moreover, the antibody levels in this group were, in general, somewhat higher than those in the wolf-bite series so successfully treated with serum plus a course of phenolized vaccine by Baltazard *et al.* [this *Bulletin*, 1956, v. 53, 434]—a finding which seems to indicate that the dosages of serum and vaccine used to immunize this group would probably be adequate for the effective protection of persons seriously at risk from rabies infection.

In further connexion with the results recorded in this paper, it was established: (a) that in no instance did the administration of either chicken-embryo or phenolized vaccine after a dose of hyperimmune serum affect the early passive antibody levels produced by the hyperimmune serum; and (b) that the active antibody response to a course of phenolized vaccine occurring from the 14th day onwards was not affected by the early presence of passive antibody resulting from a dose of hyperimmune serum. *G. Stuart*

Habel, K. **Effect on Immunity to Challenge and Antibody Response of Variation in Dosage Schedule of Rabies Vaccine in Mice.** *Bull. World Health Organization.* Geneva. 1956, v. 14, No. 4, 613–16.

The results of investigations into the possibility of reducing the number of doses of anti-rabies vaccine, while still achieving the same degree of specific immunity, are provided in this paper.

Groups of Swiss white mice, 3 to 4 weeks old, were immunized intraperitoneally with the same total quantity (1·2 ml.) of an ultraviolet irradiated killed virus vaccine given in varying numbers of divided doses spaced at varying time intervals within a 12-day period. On the 14th day after the first dose of vaccine the mice were bled and their sera tested for level of neutralizing antibodies. On the following, *i.e.*, the 15th, day all mice in each group were separated into 5 subgroups and challenged

intracerebrally with serial ten-fold dilutions of 10^{-1} to 10^{-5} of standard challenge fixed virus (CVS); the 50 per cent. end points were determined 14 days later, when the experiment was terminated.

A fair degree of protection against challenge and a good antibody response were obtained with all the 12 dosage schedules employed. Approximately the same degree of protection resulted when the same quantity of vaccine was given in 3 doses at 5-day intervals or in 12 daily doses. When the total antigenic dosage was divided into 4 doses, administered on the 1st, 2nd, 3rd or 8th, and 10th day, however, somewhat higher antibody levels were reached than with 12 daily doses of vaccine. It also emerged that consistently higher levels of protection and antibody were present in groups receiving the last dose of vaccine on or after the 10th day; in this connexion it would appear that a basic antigenic stimulus is received from the first one, two or three doses and that later doses exert a "booster" effect—an effect which is greater if this booster is applied at the 10th or 12th day than at the 8th day.

Although in these investigations a marked correlation was observed between immunity to intracerebral challenge and the amount of circulating antibody present at the time of challenge, it cannot be assumed that such immunity was wholly due to the presence of serum antibody. "Determination of the relationships between immunity and antibody levels and evaluation of the relative importance of serum antibody in the prevention of rabies under natural conditions of exposure and vaccine use in man must await results of more complex animal experiments."

G. Stuart

PLAGUE

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, rodent hosts, transmission, pathology, diagnosis, clinical findings, treatment, control.

Payne, F. E., Smadel, J. E. & Courdurier, J. **Immunologic Studies on Persons residing in a Plague Endemic Area.** *J. Immunology.* 1956. July, v. 77, No. 1, 24–33. [30 refs.]

Sera from indigenous people of Madagascar (Malgache) who had had varying types of experience of plague antigens were titrated by the haemagglutination method for antibodies against the capsular protein and murine toxin of *Pasteurella pestis*. Human type O red cells treated with tannic acid and sensitized with the appropriate antigen were found to be as suitable as sheep red cells for this purpose, eliminating the need for adsorbing sera to remove heterophile antibodies. The results showed that sera from persons who had recovered from plague usually contained appreciable levels of capsular antibodies for months or years, but rarely

contained significant amounts of antitoxin. In contrast, persons who had received plague vaccine (the living EV strain) before or after contracting plague infection usually possessed appreciable amounts of both types of antibodies for months or years. Demonstrable capsular antibody and antitoxin were present in relatively few persons after 1 inoculation of EV vaccine, but repeated vaccination enhanced the production and maintenance of antibodies. The presence of capsular antibodies in the sera of 5 persons with no history of vaccination or clinical symptoms of plague suggests that unrecognized and possibly clinically inapparent infections with *P. pestis* may occur in endemic areas. No clear-cut relationship between circulating antibody and skin reactivity to capsular protein and toxin could be established. *R. S. F. Hennessey*

Girard, G. & Chevalier, A. Comportement de *Pasteurella pestis* à l'égard du rhamnose. À propos de la communication de E. R. Brygoo et J. Courdurier. [**Biochemical Action of** *Pasteurella pestis* **on Rhamnose**] *Ann. Inst. Pasteur.* 1956, Aug., v. 91, No. 2, 263–7.

In view of the reported fermentation of rhamnose by strains of *Pasteurella pestis* from Madagascar [see this *Bulletin*, 1956, v. 53, 585], the authors examined 77 strains from their own collection (including 7 strains isolated in Madagascar) and found that 22 produced an acid reaction in medium containing rhamnose after varying periods of incubation. For 8 strains, the period in which the acid reaction was noted lay between 4 and 9 days; for 9 strains, between 10 and 20 days; and for the remaining 5 strains, between 20 and 30 days. The medium contained peptone 1 per cent., rhamnose 1 per cent., and NaCl 0·5 per cent., with Andrade's indicator. It is considered that these results were due to the development of rhamnose-fermenting mutants, and that such mutants can be detected in all strains of *P. pestis*. Fermentation of rhamnose by mutants seldom becomes apparent for 6 or more days, is irregular in its occurrence, is incomplete by comparison with that of glucose, and does not affect the practical value of the rhamnose test for the differentiation of *P. pestis* and *P. pseudotuberculosis*. *R. S. F. Hennessey*

Parry, W. R. **An Interference Phenomenon caused by** *Pasteurella pestis*. *J. Hygiene.* 1956, June, v. 54, No. 2, 227–33, 4 figs.

"An interference phenomenon was produced by the intraperitoneal injection of broth culture dilutions of *Pasteurella pestis* grown at 28°C. into small white rats.

"At a critical level of approximately 10^6 *Past. pestis* L37 marked interference was produced. Doses of 10^4 or 10^7 killed rats readily.

"Interference was produced by the addition of killed organisms, a cell-free vaccine or a live vaccine, to small lethal doses of L37.

" Non-specific interference was produced by the intravenous injection of Indian ink prior to the intraperitoneal challenge with *Past. pestis* L37."

Burrows, T. W. & Bacon, G. A. **The Basis of Virulence in** *Pasteurella pestis*: **the Development of Resistance to Phagocytosis** *in vitro*. *Brit. J. Exper. Path.* 1956, June, v. 37, No. 3, 286–99, 6 figs. [10 refs.]

This report describes changes in sensitivity to phagocytosis occurring in virulent strains of *Pasteurella pestis*. Marked resistance to phagocytosis by mouse leucocytes was produced by incubating a virulent strain for 3 hours at 37°C. in normal mouse, rabbit or horse serum or in tryptic digest broth; an avirulent strain (Tjiwidej) was unaffected by this treatment. Resistance did not appear to be affected by capsulation, which was evident in both strains. Other stock strains could be classified as virulent or avirulent according to their ability to develop resistance in broth, only 1 out of 18 strains giving a result (virulent) which disagreed with assessment by animal assay; this strain was purine-dependent, and its avirulence for mice probably reflected the non-availability of purines in the mouse. Experiments with media of differing composition showed that development of resistance was influenced by the availability of carbohydrate. Virulent organisms which had acquired resistance retained it for at least 7 hours of incubation in broth at 37°C., resistance disappearing rapidly after 4–5 hours in the refrigerator. Low concentrations of streptomycin (10 μgm./ml.) completely suppressed the development of resistance, but high concentrations (400 μgm./ml.) did not make resistant organisms sensitive. Virulent organisms grown in a medium containing mouse peritoneal fluid or whole blood produced a factor inhibiting phagocytic activity. A separate report on the antigenic aspects of resistance is to be published. *R. S. F. Hennessey*

CHOLERA

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

Lahiri, D. C., Basu, S. N., Chatterjee, S. N., Mukherjee, A. M. & Neogy, K. N. **Antibiotic Sensitiveness of Strains of Cholera Vibrio isolated during Recent Epidemic in Calcutta.** *Indian J. Med. Res.* 1956, July, v. 44, No. 3, 393–6.

" One hundred and sixty-six strains of Inaba type of cholera vibrio, isolated from a recent epidemic in Calcutta, were tested for their sensitivity against 5 different antibiotics, viz., crystalline penicillin G,

dihydrostreptomycin, tetracycline, chlortetracycline and chloramphenicol. In general, the organisms required much higher concentrations of crystalline penicillin G, and dihydrostreptomycin for their inhibition than that required by tetracycline, chlortetracycline and chloramphenicol. Each of the antibiotics, however, showed a very wide range of concentrations between which the most sensitive strains and the least sensitive strains showed their susceptibility. The concentration of a given antibiotic at which all the strains were completely inhibited showed itself to be even 50 to 100 fold of that at which only the most sensitive strains were completely inhibited.''

Banerjee, S., Sen, R. N., Sarkar, A. K., Chakrabarti, B. K. & Mandal, A. **Blood Gases in Cholera Patients and in Normal Subjects.** *Proc. Soc. Exper. Biol. & Med.* 1956, June, v. 92, No. 2, 444–5.

'' Packed cell volume, oxygen and carbon dioxide content of the whole blood and bicarbonate of the plasma were determined in 30 cholera patients and in 10 normal subjects. While there was no change in the oxygen content of the whole blood in patients suffering from cholera, the patients had a low plasma level of bicarbonate. Cholera patients suffer from acidemia and not from anoxemia.''

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

Pirlo, F. La dissenteria amebica in Italia dal 1936 al 1951. [**Amoebic Dysentery in Italy from 1936 to 1951**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1956, July, v. 37, No. 7, 354–60, 2 graphs. English summary (8 lines).

Statistics are given of the number of cases of this disease notified in the various administrative regions of Italy from 1936 to 1951. As might be expected there was a very sharp rise in the number of cases starting in 1938 and reaching a peak of some 2,000 cases in 1942, whence it descended abruptly in 1943. Notifications covering the period 1936–48 show that most cases occurred in the summer months though there were notifications throughout the year.

In the period 1936 to 1947, during the first 8 years the number of male

cases showed an enormous preponderance, and for the remainder of the period males were more numerous than female cases.

Since 1944 Sicily has shown more cases than all the rest of the regions put together, and this disparity has become more marked since 1948.

[It is a pity that all the tables and graphs do not cover the same period.] *W. K. Dunscombe*

Norris, D. L. & Beemer, A. M. **Amoebic Pericarditis—Report of a Case with Brief Review of the Literature.** *J. Trop. Med. & Hyg.* 1956, Aug., v. 59, No. 8, 188–91, 3 figs.

"A case of amoebic pericarditis and left side empyema secondary to amoebic liver abscess is reported.

"The literature on the subject of amoebic pericarditis is briefly reviewed, there being to date only 47 reported cases.

"Diagnostic problems are discussed."

Frye, W. W. **A Review of the Pathogenesis and Therapy of Human Amebiasis.** *Proc. Alumni Ass., Malaya.* 1956, June, v. 9, No. 2, 61–76. [35 refs.]

Charmot, G. & Delahousse, J. Dix observations de dysenterie amibienne traitée par la spiramycine. [**Ten Cases of Amoebic Dysentery treated with Spiramycin**] *Bull. Soc. Path. Exot.* 1956, Mar.–Apr., v. 49, No. 2, 365–73.

Ten patients, from French tropical territories, suffering from acute relapses of amoebic dysentery, were treated with 2 to 3 gm. of spiramycin daily for 10 days. The immediate clinical response was good and the stools were freed from parasites in all cases within a few days. Five patients were not subsequently re-examined; the other 5 had relapses of their amoebic dysentery and from the stools of 3 of these parasites again were recovered.

Spiramycin treatment was well tolerated, but though its immediate effect was satisfactory the end results were disappointing.

A. R. D. Adams

Faiguenbaum, J., Araya, R., Cabrera, L. & Tejeda, L. Ensayo terapéutico de la amibiasis con Tetraciclina, Dicloro-bencilo-etil-acetamida y 5,7-Dicloro-8-oxiquinaldina. [**Therapeutic Trial with Tetracycline, Dichlor-Benzyl-Ethyl-Acetamide and 5,7-Dichlor-8-Oxyquinaldine in Amoebiasis**] *Bol. Chileno de Parasit.* 1956, Jan.–Mar., v. 11, No. 1, 2–6. [14 refs.]

The English summary appended to the paper is as follows:—

"1. The authors report therapeutical trials with Tetracycline (*A*). dichloro-benzyl-ethyl-acetamide (*B*) and 5,7-dichlor-8-oxiquinaldine (*C*) in 139 human cases of chronic amoebiasis. 53 and 39 cases treated with (*A*) and (*C*) respectively for a period of 10 days, while the remaining 47 patients received (*B*) during 8 days.

"2. All patients were controlled at 10 days and at 3 months after treatment; controls were repeated at 6 and 9 months in those cases receiving (*A*) and (*B*).

"3. 92·30% of the cases treated with (*A*) showed absence of parasites at the first control, while only 65·85% and 75% of those receiving (*B*) and (*C*) respectively, were negative. After 9 months, 75% were negative for (*A*), and 80% for (*B*). 81·81% were negative after 3 months when treated with (*C*). Summing up, 86 patients persisted negative after treatment and 53 remained positive or were reinfected sometime after the treatment.

"4. Tolerance was generally good for (*A*) and (*B*), but not as good for (*C*). However the latter was administered in higher doses than usually recommended.

"5. Although the authors consider (*A*) the most efficient drug of the three tested, they recommend (*B*) as a choice due to the still higher cost of (*A*)."

Ruano, D. Amibiasis y lambliasis intestinal en los lactantes y niños de corta edad. Tratamiento con 5,7-diclor-8-oxiquinaldina. [**Treatment of Amoebiasis and Giardiasis in Infants and Children with 5,7-Dichlor-8-Oxyquinaldine**] *Semana Méd.* 1956, July 12, v. 109, No. 2, 65–8.

In Argentina, amoebiasis and giardiasis are common (the latter is stated to occur in half the children) and the author discusses the vicious circle caused by malnutrition and intestinal parasitism. The drug 5,7-dichlor-8-oxyquinaldine (Siosteran) [*Bull. Hyg.*, 1955, v. 30, 349] is said to be effective against diarrhoea and other intestinal disturbances including those which follow amoebic dysentery. It has been used for the treatment of amoebic dysentery by a number of workers [this *Bulletin*, 1952, v. 49, 864].

For paediatric use, the drug may be used in "microtablets" of 10 mgm. each. These are tasteless and easily administered to the smallest children.

The author treated 20 children, aged from 8 months to 5 years, suffering from amoebiasis or giardiasis. For amoebiasis, the dosage was 2 microtablets (20 mgm.) per kgm. body weight daily, in 2 to 3 divided doses given at meal times: for giardiasis the dosage was 23 mgm./kgm. The drug was given for 7 days: if the stools were still positive, the course was repeated after a rest of 10 to 12 days. No side effects were noted.

At the end of the treatment, 7 of 9 children with amoebiasis and 8 of 11 with giardiasis had negative stools. In most cases diarrhoea cleared up in 1 or 2 days.

The author points out, however, that a longer period of follow-up would be necessary before the exact effect of the drug could be determined.

H. J. O'D. Burke-Gaffney

Pizzi, T. Observaciones sobre fagocitosis de eritrocitos por *Entamoeba moshkovskii* Tshalaia, 1941. [**Observations on the Phagocytosis of Erythrocytes by *Entamoeba moshkovskii* Tshalaia, 1941**] *Bol. Chileno de Parasit.* 1956, Jan.–Mar., v. 11, No. 1, 7–9, 3 figs.

The English summary appended to the paper is as follows:—

"A marked phagocytic activity towards human, rat and sheep erythrocytes was observed in culture stages of *Entamoeba moshkovskii*. A marked tendency of the erythrocytes to become attached to the posterior end of the amoeba was also noticeable. Both phenomena were independent. Chicken erythrocytes attached to the amoebae but were not ingested.

"These findings are at variance with Neal's [this *Bulletin*, 1954, v. 51, 588] statement that *Entamoeba moshkovskii* will not ingest erythrocytes and tend to support the idea that this amoeba, which has been considered as a free living species, could actually have a parasitic life, just as the other known members of the genus."

RELAPSING FEVER AND OTHER SPIROCHAETOSES

Ranque, J., Depieds, R. & Faure, A. Conservation de la mobilité et de la virulence de *Borrelia hispanica* (souch Langeron) en sérum dilué. [**The Preservation of Motility and Virulence of *Borrelia hispanica* (Langeron Strain) in Dilute Serum**] *Bull. Soc. Path. Exot.* 1956, Mar.–Apr., v. 49, No. 2, 243–5.

The authors used physiological saline solution to dilute the blood of guineapigs heavily infected with *Spirochaeta hispanica* during the first febrile attack, and then maintained various dilutions under aerobic and anaerobic conditions and at different temperatures. The diluted blood was first centrifuged at slow speed to remove the blood cells before being transferred to small flasks.

A dilution of the blood to one-eighth was found to give the most favourable results combined with aerobic conditions at 4°C. Under these conditions the spirochaetes retained their motility in diminishing numbers up to the 20th day, but virulence persisted up to the 25th day.

Edward Hindle

Sparrow, Hélène. Rappel d'observations concernant le comportement des spirochètes de la fièvre récurrente dans le pou. [**A Summary of Observations concerning the Behaviour of Relapsing Fever Spirochaetes in the Louse**] *Bull. Soc. Path. Exot.* 1956, Mar.–Apr., v. 49, No. 2, 246–50.

The author recalls various observations on the subject, especially with reference to a recent publication by R. B. Heisch, "Do Spirochaetes have a Negative Phase in Lice?" [see this *Bulletin*, 1956, v. 53, 60]. During the North African epidemic of relapsing fever in 1944–46, the author studied the problem at the Pasteur Institute of Tunis, and subsequently during the maintenance of strains used for pyretotherapy in Tunis hospitals. Spirochaetes when ingested by the louse soon disappeared from the gut by passing through the intestinal wall into the coelomic fluid. In this fluid the organisms multiplied and persisted as spirochaetes during the life of the louse. Similar results were obtained when lice were fed on patients infected with *Spirochaeta hispanica* and also certain local strains. Also lice were never found to be infective unless actual spirochaetes were present in the haemocoele. Accordingly the author does not believe in the existence of a pathogenic non-visible stage of spirochaetes, and explains divergent views on the subject as the result of the methods of examining the lice, and also as due to deficiencies in the technique of maintaining lice under the most favourable conditions.

Edward Hindle

Sparrow, Hélène. Entretien de *Borrelia recurrentis* (souches éthiopiennes) par passages sur souriceaux nouveau-nés. [**The Maintenance of *Spirochaeta recurrentis* (Ethiopian Strains) by Passage in New-Born Mice**] *Bull. Soc. Path. Exot.* 1956, Mar.–Apr., v. 49, No. 2, 250–54.

The author has maintained strains of *Spirochaeta recurrentis* in the laboratory since 1946, when the last great epidemic of relapsing fever in North Africa died out. At the present time this strain does not exist in any other laboratory in Africa or Europe. The strains were isolated in 1945 from patients in the high plateaux of Ethiopia and sent to the laboratory at Tunis, since when they have been maintained either by passage from louse to louse or in new-born mice 2–3 days old. A total of 767 young mice have been infected and the mortality among them was only 8 per cent., approximately the same as that of uninoculated mice. Spirochaetes usually appear in the circulation after 24–48 hours' incubation and persist in the blood for 48–72 hours, rarely longer, and then suddenly disappear. Relapses have never been observed and the infection seems to have no effect on the health of the host. Adult mice when inoculated showed very rare spirochaetes for only a few days and it was not possible to maintain the infection by passages in adults.

Three strains were used therapeutically and one of them, Dj, after 25

passages in mice, produced a typical attack of relapsing fever when inoculated into a patient, although it gave negative results with new-born mice. From this patient, however, a new line of passages in new-born mice was established with the spirochaetes from his blood.

The author emphasizes the distinction between 2 types of relapsing fever, one transmitted by lice and the other by ticks. Rodents are well known to be reservoirs of the latter, but seem to play no part in the maintenance of the louse-transmitted strains. *Edward Hindle*

Davis, G. E. & Mavros, A. J. **An Atypical *Ornithodoros hermsi* from Utah (Ixodoidea, Argasidae).** *J. Parasitology.* 1956, June, v. 42. No. 3, 293–6.

Yasuda, J. **On the Pleomorphism in Sodoku Spirochaete. With Considerations to the Histological Findings of Experimentally Infected Animals.** *Med. J. Osaka Univ.* 1956, Mar., v. 6, No. 4, 1079–99, 14 figs. on 3 pls. [46 refs.]

LEPROSY

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

Philippines, Republic of the. Dept. of Health. **A Record of Fifty Years Work with the Victims of Leprosy at the Culion Sanitarium, 1906–1956.** pp. ix + 109, 4 figs. (2 on folding pls.) & 1 folding chart. 1956. Manila: Bureau of Printing.

Leprosy is supposed to have been imported to the Philippines by Chinese immigrants long before the coming of the Spaniards. In the middle of the 19th century the San Lazaro Hospital for leprosy patients was founded in Manila. In 1905 the island of Culion, some 200 miles south of Manila, was set aside as a leprosy colony. Gradually the number of patients rose till it reached its peak of 7,000 in 1935. By the end of 1941 the number was reduced to 5,500 as the result of the founding of local leprosaria on the other islands. During the war there was great scarcity of food, and of approximately 4,000 patients left only half survived.

Many improvements were introduced after 1915 and special treatment was introduced in 1921. During the first 4 years the death rate was 64 per cent., many of the patients being in a very bad condition when admitted, but the death rate soon fell to an average of under 10 per cent. and during the last 4 years it is only 3 per cent. Much has been done,

especially on the pathological and bacteriological aspects, by the Leonard Wood Memorial and by the staff it supplied to the colony, which has been responsible for much of the recent advance in our knowledge of leprosy.

One of the great difficulties at the Culion leprosarium is the guarding from infection of the children of leprous parents. It was not found possible to remove children from mothers till some 2 years after birth, as earlier removal resulted in a high mortality. Even of those separated at 6 months some 50 per cent. had developed the disease by the time they were 5 years old. Of 98 children admitted to a special nursery only one with congenital heart disease died, and none of them had developed leprosy at 5 or 6 years of age; whereas of 219 left in the colony from 1949 to 1954, 20·4 per cent. had become leprous. Some 18·5 per cent. of the inmates are negative and 11·4 per cent. of the non-leprous children. For economic and other reasons it has been found impossible to discharge these. Patients also often refuse medicine or take it irregularly, fearing that if they recover they will be discharged to the outside world where conditions of life are more difficult.

This brochure is a memorial of the jubilee of the colony. It is divided into 6 sections dealing respectively with general history, medical services, religious and social activities, economic and legal aspects, educational and cultural services, and such problems as those just mentioned.

[This report should be carefully studied by those interested in the control of leprosy, showing as it does the results of compulsory segregation in a distant island after a long period of years.] *Ernest Muir*

Lara, C. B. & Ignacio, J. L. **Observations on Leprosy among Children born in the Culion Leper Colony during the Pre-Sulphone and the Sulphone Periods.** *J. Philippine Med. Ass.* 1956, Apr., v. 32, No. 4, 189–97.

The large number of patients at the Culion Colony, the high birth rate and the impossibility of isolating all children at birth, have provided favourable circumstances for the observation of early leprosy and its natural transmission. There have been the same workers for the last 22 years, and accurate records have been kept during that time.

During the pre-sulphone period 20·9 per cent. of the children showed leprous lesions, but during the sulphone period the figure was 19·9 per cent. In the former period 95 per cent. of cases occurred in the first 3 years, but in the latter period only 57 per cent. occurred in the first 3 years; there was thus a delay in the onset of the disease in the sulphone period. There is also probably a lower rate of incidence in the sulphone period. Even with the small dosage used, lepra fever and ulcers and laryngeal complications have diminished or disappeared. However, the number of negative or apparently cured cases has not increased as rapidly as hoped for, and this is partly due to patients' avoiding intensive therapy because of their reluctance to leave Culion. *Ernest Muir*

Brieger, E. M. & Glauert, Audrey M. **Electron Microscopy of the Leprosy Bacillus: a Study of Submicroscopical Structure.** *Tubercle.* 1956, June, v. 37, No. 3, 195–206, 15 figs. [19 refs.]

This study was made on tissue juices rich in bacilli from 6 lepromatous patients, 4 of whom were untreated, 1 treated irregularly and 1 relapsed during treatment. Material from tuberculoid and macular cases proved to be unsuitable. For sectioned organisms, the tissue juice was mixed with glycerol agar and when set, hardened with osmic acid. After being embedded in *n*-butyl methacrylate, sections were cut at 0·05 μ thickness and examined with a Sieman's electron microscope.

Unsectioned bacilli were also examined, and they appeared as filaments 3–10 μ in length, with rod-shaped inclusions located at the ends, and transparent and swollen centres; in some of the dense regions the cytoplasm appeared to be divided into rows of beads. Among the smaller structures seen were some short dense rods, which may have been the rod-shaped inclusion bodies liberated during disintegration. Small dense granules corresponding to the metachromatic accumulations of metaphosphates seen in *Mycobacterium phlei* were present in some organisms. Besides the definite filamentous forms of organisms seen, many other shapes were recognizable, the most striking being spherical.

The sectioned bacilli showed little evidence of internal structures. In some there was a pattern similar to that of the intact bacilli, but in others there were apparently random variations in density along the bacillus. A continuous cell wall was evident. Some clumps of bacilli showed no signs of a limiting membrane, but in others there was a definite boundary of dense granular material, and it is suggested that these were globi. Some bacilli were embedded in highly vacuolated material. They were swollen, transparent and contained irregular accumulations of dense material—and were thought to correspond with the lepra cell of Babès.

The preparations also contained some intact body cells, and those containing bacilli were unusual in that the cytoplasm contained no mitochondria and was a mass of granular material.

The pleomorphism of the organism shown by this method is similar to that observed by the usual staining methods and the authors point out that if it does not represent stages in degeneration, then *Myco. leprae* must have a complex life history. *S. R. M. Bushby*

Lew, J. & Carpenter, C. M. **The Separation of *M. leprae* from Tissues by Enzyme Digestion.** *Amer. Rev. Tuberculosis.* 1956, July, v. 74, No. 1, 152.

Many of the existing methods of separating *Myco. leprae* from tissues have the disadvantage that the bacteria are exposed to chemical reagents which are deleterious. The authors, from California, now describe the

use of trypsin for separating tissue components from suspensions of *Myco. leprae* made from lepromata.

The tissue is freed from gross fat and non-infected material and boiled for 30 minutes, then finely ground in a minimal quantity of Sorenson's buffered saline (*p*H 7·6). Large particles are eliminated by centrifugation at 400 r.p.m. for 2 minutes, followed by 4,000 r.p.m. for 10 minutes to remove lipids. Sorenson's solution containing 0·5 per cent. trypsin is then added to the sediment to make a 1 in 20 dilution. The preparation is incubated at 37°C. for 90 minutes with frequent agitation and finally centrifuged at 400 r.p.m. for 10 minutes.

Typical murine leprosy was produced with a suspension of *Myco. leprae murium* from unboiled lepromatous tissue in this way, but the procedure is less effective than when the tissue is boiled.

For detecting the organism in suspected lesions, the procedure is the same, except that the final suspension is centrifuged at 3,000 r.p.m. for 30 minutes and the sediment examined for acid-fast organisms. In this way, the bacilli were concentrated from an initial 1 to 5 in 50 microscopic fields to more than 10 in a single field.

The obvious advantages of such tissue-free preparations are stressed.

H. O'D. Burke-Gaffney

Shuttleworth, J. S. & Ross, Hilary. **Secondary Amyloidosis in Leprosy.** *Ann. Intern. Med.* 1956, July, v. 45, No. 1, 23–38. [29 refs.]

In the United States the commonest cause of death in lepromatous leprosy is secondary amyloidosis. The organs affected are the kidney, spleen, liver, adrenal, gastro-intestinal tract and pancreas. There is no clear correlation between the degree of leprosy and the development of amyloidosis. The first sign is progressive proteinuria leading to hypoproteinaemia, followed by enlargement of the liver and spleen, nitrogen retention, anaemia and death. The Congo red absorption test is diagnostic only if there is 80 to 100 per cent. absorption within an hour. Persistent proteinuria is a constant finding, and is essential to a diagnosis of secondary amyloidosis. When early amyloidosis is suspected it can be confirmed or otherwise by examination of biopsy material from the liver. Addison's disease due to amyloidosis of the adrenals has not been observed.

The immediate prognosis depends on the development of anaemia, which when it becomes extreme is a sign that death is imminent, but the mortality is directly caused by amyloid involvement of the kidneys. The average duration of life after the onset of proteinuria in amyloidosis was 38·33 months in the group of cases reported, with a wide range above and below that figure. Secondary amyloidosis occurs in other diseases of long standing. It is believed that the amyloid material is a protein unit with a sulphate-bearing polysaccharide, deposited intracellularly.

Ernest Muir

Furniss, A. L. **The Testis in Leprosy.** *Indian J. Med. Sci.* 1956, July, v. 10, No. 7, 506–10, 7 figs. on 2 pls. [26 refs.]

For this study biopsy material was taken from 22 patients with the lepromatous or dimorphous type of leprosy and 8 with the tuberculoid type, patients being chosen who were undergoing an operation for some other condition. In none of the tuberculoid cases were the testes affected with leprosy. In lepromatous cases, no affected testes were macroscopically normal, most of them appearing reduced in size. The normal brown tissue was replaced by strands or patches of white fibrous tissue, and by yellow areas similar to those in leprous lymph glands. Microscopically, the tubules appeared to have an internal limiting membrane, and between the tubules there was infiltration with round cells and histiocytes, between which there were acid-fast bacilli. Later there was separation of the tubules, oedema and fibrosis. Still later the tubules became hyaline and lost their structure. The epididymis was less affected than the testis.

In 190 male patients with lepromatous leprosy there was gynaecomastia in 73; but in the series of 22 who underwent biopsy there were only 2 with gynaecomastia, so that it is not possible to record any correlation between even gross testicular affection and gynaecomastia.

It is remarked that the atrophy of the testis which is so marked in leprosy occurs " early in the disease process and unrelated to the degree of lepromatous infiltration ". In fact, the tubular degeneration may be a reaction to an injury caused by toxin or bacterium. The possible causes of gynaecomastia are discussed: " It seems that leprosy provides a good opportunity for investigating the nature and cause of the hormonal imbalance concerned in the development of gynaecomastia."

The reason for the common affection of the testis in leprosy is discussed. It is suggested that for some unknown reason the testes may form a nidus for the leprosy bacillus as does nerve tissue, and that if this reason could be discovered it might elucidate the problem of culturing the bacillus. The article is illustrated with 7 photomicrographs. *Ernest Muir*

Khanolkar, V. R. & Cochrane, R. G. **The Dimorphous Macular Lesion in Leprosy.** *Indian J. Med. Sci.* 1956, July, v. 10, No. 7, 499–505, 16 figs. on 4 pls.

Four cases of the dimorphous form of leprosy are described and illustrated by photographs of lesions and corresponding sections of biopsy material. Histological appearances characteristic of the 2 main types of leprosy appear in the same lesions. Bacilli were found in all 4 cases, and in 3 of them the lepromin reaction was slightly positive. It is considered that this form of the disease may be transformed into either the lepromatous or the tuberculoid type, but more frequently into the former than into the latter. *Ernest Muir*

DE SOUZA LIMA, L. **The "Pseudoexacerbation" Reactional State of Leprosy.** *Internat. J. Leprosy.* New Orleans. 1955, Oct.–Dec., v. 23, No. 4, Pt. 1, 429–34, 12 figs. on 4 pls. [Reprinted, in translation, from *Mem. Tercera Conferencia Panamericana de Leprologia* (1951). 1953, v. 1, 184–8.]

The term "pseudo" is used because the reaction of this nature results not in an actual exacerbation of the disease, but in improvement and sometimes in complete clearing up. It occurs in patients of the lepromatous type under sulphone treatment, and yet it has the "clinical appearance of the reactional tuberculoid eruption". Histological examination of the lesions may reveal tuberculoid and frankly lepromatous features side by side, and there may be a reactional tuberculoid histological picture without the corresponding clinical aspect. The lesions of the pseudo-exacerbation may replace those of the lepromatous type, mask them, or coexist with them. The aftercourse may be that of the reactional tuberculoid or that of the lepromatous type.

The author describes 2 groups of patients. Group 1 consisted of 29 patients. The reaction appeared suddenly and without affecting the general condition, though in some there might be slight fever and oedema of the hands and feet. New erythematous succulent lesions might appear, and there might sometimes be severe neuritis followed by muscular atrophy. The duration was usually 3–6 months. There was complete clearing up of all the cases in this group, although in 22 of them the disease had been more or less advanced. In the second group of 61 patients lepromatous and tuberculoid lesions coexisted, but in spite of this the pseudoreaction was beneficial, leading to clearing up much more rapidly than usual so that 44 could be transferred to outpatient clinics. In all patients but 2 the lepromin reaction remained negative, and in these 2 it was only slightly positive. *Ernest Muir*

DAVEY, T. F. & CURRIE, G. **Clinical Trial of Diphenyl Thiourea Compound SU 1906 (CIBA 15095E) in the Treatment of Leprosy. Progress during the First Year.** *Leprosy Review.* 1956, July, v. 27, No. 3, 94–111, 5 figs. (4 on 4 pls.).

This substance, SU 1906, is 4.butoxy-4′,dimethylaminodiphenyl thiourea (or thiocarbanilide). The test was begun in a few lepromatous- and tuberculoid-type patients, and the number was increased as its effectiveness and non-toxicity became evident. Each patient was matched against a corresponding patient on DDS. It has now been given to 40 patients over periods of 4 to 16 months. A daily dose of 1 gm., increased by 0·5 gm. at fortnightly intervals, was given while the tuberculoid cases were watched for signs of resolution. These signs appeared at 1·5 gm. doses, and accordingly double that amount (3 gm.) was chosen as the standard maximum dose. It has been well tolerated

without signs of gastro-intestinal, hepatic, kidney or other signs of toxicity. Occasional slight skin irritation could not be related to the drug administration, as it disappeared in a few days although the treatment was not stopped.

Of 17 lepromatous patients all showed clinical improvement, the 12 under treatment for more than 12 months comparing favourably with the corresponding DDS patients. Bacteriological improvement was better on an average than with DDS for the first 9 months, but after that time 5 of the 12 showed a falling off while the other 7 continued to show uninterrupted progress. Improvement in the tuberculoid, borderline and indeterminate cases was similar with the 2 drugs. In 5 severe lepromatous patients who were not making much progress under DDS, a daily dose of 1·5 gm. of SU 1906 was tolerated and all showed improvement, which was accelerated in 3 of them. Similar improvement was shown in 2 indeterminate cases showing fresh macules after 40 and 50 months of DDS treatment. Also 3 patients with persistent neuritis under DDS have shown general improvement as well as the clearing up of the neural symptoms on receiving SU 1906.

It is mentioned that a trial was made by Buu-Hoï *et al.* with a similar preparation, diethyloxythiocarbanilide [see this *Bulletin*, 1956, v. 53, 202], in 13 cases, with good results, and by Schwarz *et al.* in tuberculosis with yet another preparation. All 3 preparations showed low toxicity. The question is whether or not drug resistance will develop. The promising features found so far are the absence of toxicity, and of erythema nodosum to any great extent, and the indication that patients intolerant of DDS or ceasing to make further progress with DDS may benefit with SU 1906. Moreover, bacteriological improvement appears to be more rapid. *Ernest Muir*

Brown, J. A. K. **The Uganda Leprosy Control Scheme.** *East African Med. J.* 1956, July, v. 33, No. 7, 259–70, 4 figs. & 1 map.

A description is given by the author of the leprosy control scheme which he first introduced in Eastern Nigeria, and has now applied in Uganda. In undeveloped countries like these, with high incidence, compulsory segregation is impracticable. Up to 1951 there were 4 settlements in Uganda, and in that year a fifth was added. In Uganda the people live widely separated, and 300 yards may separate a family from its neighbours. Surveys were carried out with the help of the district health staffs and the chiefs, who explained to the people the objects of the survey.

In the Northern, Eastern and Western Provinces and in Buganda the estimated cases were respectively: 12,500; 39,800; 7,600; and 7,900. The proportions of lepromatous type varied in the provinces, being 7·5 per cent. in the Northern, 5 per cent. in the Eastern, 19 per cent. in the

Western, and 8·9 per cent. in Buganda. It is calculated that there are 4,900 lepromatous cases in all.

It was considered that to open large numbers of out-patient clinics would not be an efficient measure of control, as the patients would not attend regularly. In place of this, treatment villages of simple construction were erected, accommodating from 20 to 400 patients (optimum 100). Of these there are now more than 40. In this way the danger of spreading infection is diminished. Under average conditions all lepromatous and all child patients within 15 miles of a medical unit should be admitted to a treatment village.

Treatment is with DDS tablets, beginning with 1 tablet a week, rising by 1 additional tablet a week every month till a maximum of 6 tablets is reached. Between 30 and 40 per cent. of the patients in the country are now able to obtain treatment regularly, as compared with 5 per cent. in 1951. "The rate of progress has been due to the general anxiety of the peasants about the disease, to the influence of the surveys which have stimulated local interest and to the attempt to keep every aspect of the scheme as simple as possible." *Ernest Muir*

Naguib, M., Rees, R. J. W. & Robson, J. M. **Production of Leprous Lesions by *Mycobacterium lepraemurium* exposed to Heat or to an Antiseptic.** *J. Path. & Bact.* 1956, Apr., v. 71, No. 2, 409–20, 7 figs. (4 on 2 pls.).

"Suspensions of *Mycobacterium lepraemurium* obtained from rat leproma were heated at 60°C. for 15, 60 and 120 minutes, and subjected to the action of a 1 in 10,000 solution of Merthiolate. They were then inoculated into the cornea of mice. Untreated suspensions were inoculated as controls.

"Lesions were first evident in the control animals in about three weeks; they developed gradually and spread both locally and systemically.

"In animals inoculated with treated bacilli, lesions developed after a much longer latent period, up to 8 months from inoculation, and spread systemically.

"The administration of isoniazid to animals inoculated with heat-treated bacilli still further delayed the appearance of lesions and reduced the number of animals in which they developed."

[See this *Bulletin*, 1953, v. 50, 524.]

HELMINTHIASIS

In this section abstracts are arranged as far as possible in the following order:—Trematodes (*schistosomes, other flukes*); Cestodes (*Diphyllobothrium, Taenia, Echinococcus, other cestodes*); Nematodes (*Hookworms, Ascaris, Filarial worms, Dracunculus, etc., Trichuris, Enterobius, Trichinella, etc.*).

See also p. 1401, Brumpt & de Rocca Serra, Danger de l'introduction en Corse de nouvelles souches de paludisme et de la bilharziose vésicale. [**Danger of Introducing New Sources of Malaria and Urinary Schistosomiasis into Corsica**]

Smithers, S. R. **On the Ecology of Schistosome Vectors in the Gambia, with Evidence of their Rôle in Transmission.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1956, July, v. 50, No. 4, 354–65, 7 figs. on 2 pls. & 1 map. [16 refs.]

Bulinus (*Physopsis*) *jousseaumei*, *B.* (*B.*) *guernei*, *B.* (*Physopsis*) *globosus*, *B.* (*B.*) *senegalensis*, *B.* (*B.*) *forskali* and *Biomphalaria pfeifferi gaudi* [identifications by Dr. G. Mandahl-Barth], have been incriminated as actual or potential vectors of schistosomiasis in the Gambia. A study was made of the ecology of each species and conclusions were drawn concerning the epidemiology of schistosomiasis in relation to seasonal fluctuation in the occurrence of known or potential vectors. In those species found shedding schistosome cercariae in the field, identification of the schistosome species was made by exposure of mice to infection and followed later by examination of the adult schistosomes recovered. Of the *Bulinus* species, *B. jousseaumei* and *B. guernei* were found to be vectors of *Schistosoma haematobium* alone, while *B. senegalensis* was found to be a vector of *S. haematobium* and *S. bovis*. *B. globosus* and *B. forskali* were both found in areas where urinary schistosomiasis was endemic. *B. globosus* was found only once, and in small numbers, in conjunction with *B. forskali*. *B. forskali* was much more widely distributed, except in laterite pools, and when found in one small isolated endemic focus at Kartung where urinary schistosomiasis was prevalent, this species was the only possible vector present. *B. forskali* was proven a potential vector by successful experimental infection with miracidia of Kartung origin. However, neither *B. globosus* nor *B. forskali* was positively incriminated as a vector in the field, but they must remain suspect on epidemiological grounds. *S. mansoni* has not been found in the Gambia and no *B. p. gaudi* were found shedding cercariae.

Certain marked ecological variations occurred in the distribution of the snail species. *B. jousseaumei* and *B. guernei* were found in cool, clear flowing water in the steep-sided tributaries (" bolons ") feeding the main river. Transmission was not markedly seasonal. *B. senegalensis* was confined to temporary laterite pools on the plateau above the upper reaches of the river and transmission was definitely seasonal. *B. forskali* was

found widely distributed in temporary alluvial pools associated with rice swamps, and transmission [?] was considered seasonal.

Three definite and two potential vectors of urinary schistosomiasis have been identified in the Gambia where, with one notable exception, the endemic areas are confined to the eastern half of the country.

O. D. Standen

Kollert, W. F. Die Behandlung der Blasenbilharziasis westafrikanischer Schulkinder mit Miracil D. [**The Treatment of Vesical Schistosomiasis in West African Schoolchildren with Miracil D (Lucanthone)**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1956, June, v. 7, No. 2, 153–62. [14 refs.]

This work was carried out at Malange in Angola. Vesical schistosomiasis was diagnosed in 74 out of 192 girls at the mission school and in 18 out of 108 boys; the ages were between 9 and 18 years and at school the children were safeguarded from fresh infection. Sixty-five children were selected for treatment, and were divided into 4 groups:—

Group 1—30 mgm./kgm. per day for 3 days—total 90 mgm./kgm.
Group 2—20 mgm./kgm. per day for 5 days—total 100 mgm./kgm.
Group 3—20 mgm./kgm. per day for 7 days—total 140 mgm./kgm.
Group 4—total 100 mgm./kgm. spread over 6–10 days, beginning and ending with small doses.

The drug was given twice daily, after morning and evening meals. Toxic effects were most pronounced in Group 1. They included anorexia, nausea and vomiting, headache and body pains, making continuation of treatment difficult. Some children suffered from insomnia and vertigo. The effects were least in Group 4, in which they were trifling. All toxic effects ceased within 2 days after the end of the course. These effects were partially relieved by belladonna and bananas.

The therapeutic effects were judged by examination of the urine monthly for 3 months. All children had ceased to pass eggs after the first month except for 2 out of 10 in Group 2 and 2 out of 15 in Group 3.

It is concluded that the dose schedule of Group 4 is the best tolerated of those tested and it is also therapeutically effective. The total dose should be 100 mgm. per kgm. and this should be given in doses which gradually increase to a maximum and then diminish gradually during 6–10 days.

F. Hawking

Schwetz, J. **Rôle of Wild Rats and Domestic Rats** (*Rattus rattus*) **in Schistosomiasis of Man.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1956, May, v. 50, No. 3, 275–82. [17 refs.]

"The localities of Albertville, Elisabethville and Sanakia in the Belgian Congo contain foci of human intestinal schistosomiasis due to *S. mansoni*, as well as foci of *S. rodhaini*, the causal agent of a schistosomiasis among

wild rodents. In the course of our researches in these three localities, we discovered in several rats seemingly infected with *S. mansoni*, eggs that differed in their structure from the usual run of eggs of this species. We subsequently named this new schistosome *S. mansoni* var. *rodentorum*; it causes a light infection in rodents indicated usually by the finding of several broken or empty eggs in the liver. Since both human beings and rodents frequent the same rivers and the same swamps infested with molluscs shedding schistosome cercariae, it was quite obvious that we are in the presence of the same illness and of a common source of infection. We subsequently wanted to ascertain whether this was a general phenomenon, that is whether rodents living in the proximity of foci of human infection with *S. mansoni*, are usually or frequently infected with *S. mansoni*, or whether this was only a regional, specific occurrence. Having this object in mind, we examined 429 wild rats and 58 *R. rattus* coming from four foci of human schistosomiasis: Lake Kivu, Lake Albert, Bunia and Irumu; and only in this last focus did we find one rodent naturally parasitized by *S. mansoni* var. *rodentorum*. We next examined, without any positive result, 185 wild rats and 64 *R. rattus* in the *S. haematobium* focus of Kongolo; and 41 wild rats as well as 10 *R. rattus* in the focus of *S. intercalatum* infection in Stanleyville.

" Thus it seems that natural infections of rodents with *S. mansoni* var. *rodentorum* are very rare, the existing cases being localized. Even in the *S. mansoni* foci of Katanga, we could find rats infected with *S. mansoni* var. *rodentorum* only in the mixed foci of *S. mansoni* and *S. rodhaini*; that is, in places where rats are the definite host of another schistosome. It is moreover quite understandable that since rats are very receptive to schistosomal infection, and are consequently employed as intermediate hosts in experimental schistosomiasis, they might occasionally and exceptionally become the definitive hosts in a natural infection. The last word on this subject has not been said yet."

Schneider, M. D., Radke, M. G. & Coleman, M. T. **Immunologically Reactive Substance from** *Schistosoma mansoni*. *Exper. Parasit.* New York. 1956, July, v. 5, No. 4, 391–7, 1 fig.

Schistosoma mansoni worms were disintegrated and shaken with a mixture of chloroform 4 parts and isoamyl alcohol 1 part plus water 10 parts. The aqueous phase was separated off and purified by dialysis. The final non-dialysable cell-free extract represented 10–20 per cent. of the dry weight of the worms and 7–9 per cent. of nitrogen. It contained carbohydrate and nucleoprotein. The extract contained a heat stable antigen which reacts at 1 in 200,000 in the complement-fixation test with serum from human beings infected with *S. mansoni*; and it also reacts with a heterophile substance present in normal rabbit serum. The value of this reagent for the clinical diagnosis of human schistosomiasis remains to be investigated. *F. Hawking*

Newsome, J. **Problems of Fluke Immunity: with special reference to Schistosomiasis.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1956, May, v. 50, No. 3, 258–74. [59 refs.]

The author discusses the relevant literature concerning the development in the vertebrate host of resistance to certain schistosome infections normally occurring to man. "In studying this subject the literature on immunity to helminth infections has to be surveyed with caution. There is a mass of material, of great interest, which can do no more than suggest how such immunity might operate by analogy between effects in animals and in man, or between one genus of worms and another." The scope of this limited survey is described as follows: "Evidence for the existence of immunity or resistance to schistosome infection in man and animals is first discussed, and the properties of the mechanism, as far as they are known, are then considered. So little is in fact known about the properties of resistance that a tentative list is presented of the fundamental information which is lacking, and detailed consideration is given to some of these gaps in our knowledge. This leads to a number of proposals for jumping-off points for individual investigations which the material considered suggests to be of interest and importance."

As a result of his own observations and of his survey of the literature the author records the following conclusion. "It is important to know much more about resistance to schistosomiasis in man. The disease is spreading and is likely to continue to do so in the near future. Before good policies for treatment and prevention in different populations can be evolved with confidence, the fundamental factors and mechanisms in the natural and acquired resistance in man need further investigation. In spite of much supposition by analogy, virtually nothing is certainly known about the subject, and everyone interested in problems of schistosomiasis —clinician, public health officer and laboratory worker alike—has his own views based on his own observation. Not until the fundamental work has been well started will its utility appear. The results may well show that control schemes which fail to take account of the resistance or immunity of the population are playing with fire." *R. M. Gordon*

Kuntz, R. E. **Evaluation of Sodium-Pentachlorophenate as a Molluscicide in Egypt.** *Amer. J. Trop. Med. & Hyg.* 1956, Mar., v. 5, No. 2, 274–85. [11 refs.]

Laboratory controlled molluscicide trials with sodium-pentachlorophenate were carried out in porcelain bath tubs of 250–300 litres capacity. The tubs were filled with water over a 3-inch layer of Nile mud and planted with aquatic vegetation to provide a habitat similar to that found in nature. For test purposes 50 each of *Biomphalaria boissyi* and *Bulinus truncatus* were placed in each tub. For ovicidal tests *Elodea*, bearing egg masses, was kept submerged 2–4 inches below the surface of water in

Petri dishes and subsequently removed for examination. Field trials were conducted in different kinds of habitat, *viz.*, still water in dead-end canals, running water of irrigation canals and sluggish water of drainage ditches. The test areas of water ranged from those ½ metre wide by 6 centimetres deep and 20 metres long, to those 7 metres wide, 1½ metres deep and 450 metres long. Test dips for snails were made at intervals of 5–10 metres from both sides of the areas with a standard triangular dipper.

In the tub tests the chemical was added in solution to provide the necessary concentration. In the field running water was treated by suspension of bags of chemical pellets in the water above the stretch to be examined; the most convenient way of treating still water and drainage ditches was the distribution, by hand, of sawdust and wood shavings saturated with a solution of the test compound.

Criterion of death in treated snails was failure to respond to moderate probing of the soft parts of relaxed snails or prolonged contraction within the shell after transference to fresh water.

It was found that molluscicidal efficiency of sodium pentachlorophenate was closely related to water temperature. In the tub tests at concentrations of 2–15 parts per million, the number of deaths during the summer months was about twice that in tubs exposed to winter temperatures. Generally, *Bulinus* was more affected than *Biomphalaria*. In experiments designed to determine the time of exposure required to kill most of the snails, it was found that the majority of both species died after exposure for 6 hours at 6 p.p.m. As a test for residual toxicity fresh batches of snails were added daily for several days to tubs originally containing up to 20 p.p.m. Below the maximum concentration it was found that toxicity fell off very rapidly after the 4th day, but at 20 p.p.m. the majority of snails died as late as the 10th and 11th days after the beginning of the test at summer temperatures. In ovicidal tests 1 per cent. of 3,000 eggs survived exposure to 10 p.p.m. compared with 70 per cent. in controls.

In field trials in shallow canals all snails were killed at a concentration of 8 p.p.m., but in deeper waters 10 p.p.m. did not kill them all. In deep, slow-flowing waters 15 p.p.m. killed all *Bulinus* and *Biomphalaria*.

Only low-grade residual toxicity was found in field trials. In tests with bags of chemical pellets suspended in canals 3 metres wide and with considerable flow of water, an estimated 10 p.p.m. killed 80–90 per cent. of snails in the first 100 metres down-stream and over 60 per cent. at 200–300 metres. The snail population was markedly reduced for several weeks, but some snails were always found. Sodium pentachlorophenate was markedly toxic to fish. It is concluded that this chemical shows variable efficiency from test to test and also varies according to temperature and ecological surroundings. However, on the arbitrary standard of Dobrovolny and Barbosa [this *Bulletin*, 1955, v. 52, 380] that a chemical is efficient for snail control if it reduces the numbers 90 per

cent. or more, it is suggested that sodium pentachlorophenate should be applied in Egyptian irrigation systems at 15 to 20 p.p.m. to ensure kill of most of the schistosomiasis vectors throughout the year: this concentration should be maintained for 12 and preferably 20 to 24 hours.

O. D. Standen

DE MEILLON, B., ENGLAND, E. C. & LÄMMLER, G. **Experimental Bilharziasis in Animals. IV. Chemoprophylaxis in Bilharziasis.** *South African Med. J.* 1956, June 30, v. 30, No. 26, 611–13, 1 fig.

A drug called S 616 (Farbwerke Hoechst, composition not revealed) was tested against *S. mansoni* in mice both in Germany and in S. Africa. When given as a single dose by mouth within the first 4 days after exposure to cercariae it prevented infection, but it did not do so if given 10–35 days after exposure. After the 35th day (when the schistosomes are sexually mature and have migrated to the mesenteric veins) a single oral dose of 40–50 mgm./kgm. cured almost 100 per cent. of the mice. The drug rapidly killed cercariae *in vitro* in a concentration of 25 μgm./ml.

[Until more is known about the toxicity and the chemical composition of this drug, judgment about its clinical prospects must be suspended.]

F. Hawking

OLIVIER, L. **Observations on Vectors of *Schistosomiasis mansoni* kept out of Water in the Laboratory. I.** *J. Parasitology.* 1956, Apr., v. 42, No. 2, 137–46, 2 figs. [15 refs.]

Experiments were made in north-eastern Brazil to compare the degree of resistance to desiccation between *Australorbis glabratus* and *A. centimetralis* when maintained in the laboratory in the dry state but in an atmosphere of relatively high humidity, and to determine the relative resistance of different strains of these species taken from different habitats. The snails were collected either in the dry state from among debris left after temporary pools had dried up or were taken from permanent waters. They were maintained in the laboratory in clay pots covered with protective gauze.

It was found that both *A. glabratus* and *A. centimetralis* varied considerably in their ability to resist extended periods out of water and that this variability could be related to the source of collection. *A. centimetralis* collected from dry vegetation in one area lived 5–21 months out of water, while those from other habitats lived only a few days under identical conditions. In general it is concluded that the snails that survived least well came from permanent waters where they would have had least opportunity to develop resistance to drying. Conversely, those snails collected from pools subject to seasonal drying would have had opportunity to develop resistant strains. The experiments with *A. glabratus* gave results similar to those with *A. centimetralis*. Snails taken from the lake in Salvador lived for a short time only, while those of the

same species taken from temporary pools in Recife and Paulista lived up to 285 days under essentially the same conditions.

It is considered that the experiments indicate the presence of important differences in strains within both species which determine ability to live out of water. Because of the high humidity under which the experiments were conducted it is not claimed that these snails can withstand severe desiccation [see also this *Bulletin*, 1956, v. 53, 1016]. *O. D. Standen*

Olivier, L. & Barbosa, F. S. **Observations on Vectors of *Schistosomiasis mansoni* kept out of Water in the Laboratory. II.** *J. Parasitology.* 1956, June, v. 42, No. 3, 277–86, 1 fig. [17 refs.]

This paper forms the second in a series on the same subject [see above]. In the experiments described in this paper, *Australorbis glabratus* and *Tropicorbis centimetralis* were collected from the field and subjected to gradual drying in large boxes of soil that were originally either moist or completely flooded. In the box experiments, 2,000–5,000 snails were employed in each instance. When dry, the soil was marked off into numerous equal portions and these were removed at regular intervals for counting and observation of the contained snails. For the most part, viability of the snails was estimated by the light-beam technique. The temperature ranged from 25°–28°C. in the wet season to 27°–30°C. in the dry season. The humidity was variable but usually ranged from 75 to 90 (wet season) and 65 to 75 (dry season).

It was found that under conditions of gradual drying *T. centimetralis* tended to live longer than *A. glabratus*. However, it is felt that if specimens of the latter had been taken from temporary pools, the survival time may have been longer. Nevertheless, the experiments demonstrated that both species can live for long periods out of water, under certain conditions. Under the conditions described, many lived for several weeks and some lived over one year. Most of the snails remained on the surface. Gradual drying on the surface of moist or wet soil proved the most suitable condition for survival. Snails buried in dry soil survived as well as those on the surface but in experiments where snails were buried in mud saturated with water, death occurred rapidly. *O. D. Standen*

Oliver-González, J., Bauman, P. M. & Benenson, A. S. **Effect of the Snail *Marisa cornuarietis* on *Australorbis glabratus* in Natural Bodies of Water in Puerto Rico.** *Amer. J. Trop. Med. & Hyg.* 1956, Mar., v. 5, No. 2, 290–96, 4 figs.

The fresh-water mollusc, *Marisa cornuarietis*, was found in an area of creek in Puerto Rico where *Australorbis glabratus* had been eliminated some 2 years earlier, after treatment with sodium pentachlorophenate. There was a history of subsequent reappearance of *A. glabratus* followed

by replacement with *M. cornuarietis*. Further examination of the creek showed that the colony of *Marisa* extended for some distance down-stream. *Australorbis* was not found where *Marisa* was plentiful but was present in large numbers in other parts of the stream. In 1 collecting station where both snails were present and in 2 stations down-stream where only *Australorbis* was present, population studies over the period of a year showed a decline in *Australorbis* eventually culminating in elimination. In the upper station only a small number of *Marisa* remained, while in the down-stream stations the species became numerous.

Experimental transplantation of 13,000 *Marisa* was made to 3 sites in the lowest part of the creek and which were known to contain *Australorbis*. Re-examination of these sites 10 months later showed *Marisa* to be present but *Australorbis* absent. In neighbouring streams *Australorbis* was present in large numbers and *Marisa* absent. The introduction of 2,000 *Marisa* to an isolated pond containing *Australorbis* resulted in the disappearance of the latter but the persistence of *Marisa*.

It is concluded that the voracious feeding habits of *Marisa* may account for the disappearance of *Australorbis* by the former eating the eggs of the latter or by proving more successful in competition for food [see below]. *O. D. Standen*

Chernin, E., Michelson, E. H. & Augustine, D. L. **Studies on the Biological Control of Schistosome-bearing Snails. I. The Control of** *Australorbis glabratus* **Populations by the Snail,** *Marisa cornuarietis*, **under Laboratory Conditions.** *Amer. J. Trop. Med. & Hyg.* 1956, Mar., v. 5, No. 2, 297–307, 2 figs.

Adult *Marisa cornuarietis* collected in the field were maintained in laboratory culture for study of their habits. Preliminary observations in tanks containing both *M. cornuarietis* and *Australorbis glabratus* and in tanks containing *A. glabratus* alone showed that the weight of food consumed by *Marisa* was very much greater than that consumed by an equivalent number of *Australorbis*. Similarly, there was some evidence that *Australorbis* egg masses were destroyed by *Marisa*.

In an experiment where *Australorbis* egg masses present on watercress stalk were offered to *Marisa* in the absence of other food, all were eaten by the 3rd day. In another experiment designed to determine the effects of *Marisa* on cultures of *Australorbis*, it was found that in a tank with a limited amount of food and both snails present only occasional *Australorbis* egg masses were seen; in a tank with excess of food, *Australorbis* egg masses were continuously present but in neither of the tanks did any young of this species develop. In the control tank of *Australorbis* alone, large numbers of young snails were found at the end of the 2-month experiment. It was further shown that in tanks where varying numbers

of *Marisa* had been introduced the number of young *Australorbis* present at the end of 5 weeks varied inversely with the proportion of *Marisa*. *Marisa* was also shown to destroy recently hatched *A. glabratus* of less than 1 mm. diameter.

It is concluded that *Marisa* is not a purposeful predator of the immature stages of *Australorbis* but that the egg masses of the latter are consumed during the voracious feeding of the former. It is considered that from laboratory experiences *M. cornuarietis* is capable of limiting the growth of *A. glabratus*.

[In an addendum it is stated that the generic name *Ceratodes* Guilding, 1828 has technical priority over *Marisa* Gray, 1824.] *O. D. Standen*

Chernin, E., Michelson, E. H. & Augustine, D. L. **Studies on the Biological Control of Schistosome-bearing Snails. II. The Control of *Australorbis glabratus* Populations by the Leech, *Helobdella fusca*, under Laboratory Conditions.** *Amer. J. Trop. Med. & Hyg.* 1956, Mar., v. 5, No. 2, 308–14, 1 fig. [14 refs.]

In laboratory experiments in biological control of *Australorbis glabratus* by the leech *Helobdella fusca*, it was found that the unengorged leeches made no predatory attacks upon snail egg masses, but that high mortality occurred in the newly hatched snails. Where young and adult snails were offered simultaneously, the adult snails appeared to suffer no harm, while the young snails were destroyed. It was observed that in an aquarium well stocked with vegetation and equipped with 50 *A. glabratus* and 25 *Helobdella* no increase in snail population occurred, although egg masses were seen regularly on the water plants. In contrast, the snails in the control tank had increased enormously over the 60-day period of observation. The predatory feeding habits of *Helobdella* and the snail reactions are described. Adult leeches anchor themselves on the shell and probe deep into the cavity until the snail is devoured. Young leeches may disappear into the cavity of the shell and have been found attached in the mantle region.

The authors conclude that *H. fusca* is a most effective means of control of *A. glabratus* in the laboratory, but trials must be made under field conditions. This is likely to be complicated by the fact that the two organisms are not known to occur together in nature. *O. D. Standen*

Klock, J. W. **A Field Technique for Quantitative Estimation of the Molluscicide Sodium Pentachlorophenate based on Fish Mortality Rates.** *Amer. J. Trop. Med. & Hyg.* 1956, Mar., v. 5, No. 2, 286–9, 1 fig.

The standard employed in these trials was the mortality rate observed in 30–50 guppies (*Lebistes reticulatus*) per litre of water when exposed

to concentration of 2–25 p.p.m. sodium pentachlorophenate. With different exposure times, standard curves may be drawn which enable quantitative estimations of sodium pentachlorophenate to be made in natural waters during the course of field trials with this molluscicide.

O. D. Standen

Otori, Y., Ritchie, L. S. & Hunter, G. W. **The Incubation Period of the Eggs of** *Oncomelania nosophora*. *Amer. J. Trop. Med. & Hyg.* 1956, May, v. 5, No. 3, 559–61, 1 fig.

Female *Oncomelania nosophora* were maintained on filter paper in Petri dishes containing decayed leaves and straw as food. Dried mud cubes were introduced to provide suitable sites for egg-laying and were removed and replaced at regular intervals for observation of the eggs deposited. Most of the eggs were laid on the mud but some were deposited on the leaves and straw. The egg cases were encased in a layer of mud-like material or were, in some instances, almost submerged in the mud. The mud cubes and isolated eggs were removed each 24 hours and placed in incubation chambers. The hatching rate was variable. Some eggs hatched as early as 11–14 days after they were laid, but others took as long as 35 days. In March–April, when day temperatures were 20–25°C., maximum hatching occurred on the 24th–25th day of incubation; in May–June, when day temperatures were 24–29°C., peak hatching occurred from the 18th to the 19th day. It is concluded that the incubation period is materially affected by change in temperature, and that the relatively wide variation in incubation period observed at any given temperature possibly constitutes a biological device to ensure against the effects of temporarily dry conditions likely to destroy newly hatched snails.

O. D. Standen

Wagner, E. D. & Wong, Lois W. **Some Factors influencing Egg laying in** *Oncomelania nosophora* **and** *Oncomelania quadrasi*, **Intermediate Hosts of** *Schistosoma japonicum*. *Amer. J. Trop. Med. & Hyg.* 1956, May, v. 5, No. 3, 544–52, 1 fig. [12 refs.]

In observations extending over a period of 1 year, experiments were performed with *Oncomelania nosophora* and *O. quadrasi* to determine selectivity in choice of sites for egg-laying, the effect of water level on the rate of reproduction, the effects of temperature on reproduction and the relation of oviposition to the water line. The *O. nosophora* came from Japan and the *O. quadrasi* from the Philippines. In all experiments only adult snails of known sex were employed. Unglazed porous clay saucers were used as containers for the snails and were provided with a standard mixture of sterilized soil, sand and gravel made into a firm mud. The standard mixture was modified in certain saucers either by substitution

with sand or the addition of soil, sand, brick, wood, maple-leaves or filter paper to provide a variety of egg-laying sites. The saucers were kept in constant-temperature rooms providing a range of 20°C., 26°C. and 32°C.

In selection of materials for oviposition, *O. nosophora* was found to differ from *O. quadrasi*. With *O. nosophora*, 91 per cent. of the eggs were found on soil, 6 per cent. on gravel, 2 per cent. on saucer walls, less than 1 per cent. on brick and leaves and none on wood and filter paper. Only 1 young snail was found in cultures with sand alone. *O. quadrasi* was much less specific in choice of egg-laying sites, the greatest proportion (31 per cent.) being found on brick. All other materials except sand were used indiscriminately.

The water level in the saucers was found to be important for *O. nosophora*. Saucers filled to one-third with water provided the best conditions for egg-laying compared with those that were fully flooded or just kept moist. Snails in saucers with moist materials but no water produced the least number of eggs. *O. quadrasi* was again much less selective in requirements and produced almost equivalent numbers of young in each type of environment, but with some preference for the medium water level.

In both species more young were produced at 26°C. than at 20°C. or 32°C., but with the highest temperature being the least productive.

In both species the great majority of the eggs were laid above the water line. The proportions were 94 per cent. for *O. nosophora* and 71 per cent. for *O. quadrasi*.

These observations should prove of considerable interest to those experimenting with the culture of *Oncomelania* spp. *O. D. Standen*

Wagner, E. D. & Moore, Barbara. **Effects of Water Level Fluctuation on Egg laying in *Oncomelania nosophora* and *Oncomelania quadrasi*.** *Amer. J. Trop. Med. & Hyg.* 1956, May, v. 5, No. 3, 553–8, 6 figs.

Pyrex dishes containing soil-sand mixture and a variety of other materials such as brick, wood, maple-leaf and filter paper as potential egg-laying sites, were provided with a standard water level of one-quarter of their capacity. Ten male and 20 female *Oncomelania nosophora* or *O. quadrasi* were placed in each dish. For each species, one group of dishes was flooded for 18 hours every 2 weeks. Records were kept of the effect of such flooding on the reproductive capacity of the snails compared with that of the controls where the water level remained constant. The tests were repeated 3 times for each species.

Although a considerable degree of variation was found between each of the experimental groups, it was found that where flooding occurred, some reduction in egg laying was induced with *O. nosophora* but that the egg-laying capacity of *O. quadrasi* increased in the ratio of 2·2:1. *O. nosophora* laid 92 per cent. of eggs above the water line and *O. quadrasi* 84 per cent. at this level. *O. D. Standen*

Dao, Chin, Fu, Fu-Yuan & Ch'i, Wei-Liang. **Pulmonary Manifestations in Schistosomiasis following Tartar Emetic Therapy.** *Chinese Med. J.* Peking. 1956, May–June, v. 74, No. 3, 268–74, 4 figs. on 2 pls.

"1. Four cases of schistosomiasis that developed pulmonary lesions following tartar emetic therapy are reported.

"2. The characteristics of the complication are listed. The apparent well-being of the patient and the self-limited course of the complication are most striking and help to differentiate this condition from other simulating lung conditions.

"3. Either a fresh dissemination of ova to the lungs or a reactivation of pre-existing lesions is thought to be the cause of this manifestation. The former, however, is considered more probable."

Chung, Huei-lan, Weng, Hsin-chih, Hou, Tsung-ch'ang & Ho, Lien-yin. **Cross Intradermal Reactions of Patients with Paragonimiasis, Clonorchiasis and Schistosomiasis to Different Trematode Antigens and their Clinical Significance.** *Chinese Med. J.* 1955, Sept.–Oct., v. 73, No. 5, 368–78, 4 figs. [15 refs.]

A study was made of the cutaneous reactions in infection with 3 trematodes, *Paragonimus westermani*, *Clonorchis sinensis* and *Schistosoma japonicum*, after intradermal infection of antigenic extracts made from the adult worms of these 3 together with that from *Fasciola hepatica*, the point of especial interest being the cross-reactions.

The adult worms were obtained from infected cats, cows and rabbits. The worms were minced and ground, and a 4 per cent. extract was made in normal saline. This was diluted to 0·4 per cent. before being injected at 15 cm. intervals into the skin of the flexors of the forearms of 29 subjects; they consisted of 5 normal controls, 1 patient with kala azar, 18 with paragonimiasis, 2 with clonorchiasis and 3 with schistosomiasis (*S. japonicum*).

The readings recorded were made between 10 and 15 minutes of the injection and the reactions consisted in an amoeboid weal, surrounded by a zone of erythema and accompanied by irritation. The weal began to subside after an hour.

Of the 18 cases of paragonimiasis, all showed a positive reaction—a weal of 3–4 cm. in diameter—to injections of *Paragonimus*, *Fasciola* and *Clonorchis* antigens and 6 showed a positive reaction with *Schistosoma* antigen. In each case the reaction was slightly greater with the homologous antigen.

Of the 2 patients with clonorchiasis, both showed a positive reaction with the same 4 antigens but in this case the reaction was greatest with the *Fasciola* antigen.

Of the 3 patients with schistosomiasis, all showed a positive reaction with all 4 antigens, the reaction with the homologous antigen being the greatest in each case.

The reactions in the control cases were uniformly negative (0·5 to 1·0 cm. diameter without erythema), as also were those with the control solutions, namely, normal saline containing 1 in 10,000 of sodium ethylmercuric thiosalicylate, which was added to all the antigen preparations.

The significance and the diagnostic value of these tests is discussed.

L. E. Napier

Maekawa, K. & Kushibe, M. Sur la composition chimique de l'antigène pour la dermo-réaction allergique vis-à-vis de *Fasciola hepatica*. [**The Chemical Composition of the Antigen for the Allergic Skin Reaction for** *F. hepatica*] *C.R. Soc. Biol.* 1956, v. 150, No. 4, 832–4. [12 refs.]

Watson, J. M. & Kerim, R. A. **Observations on Forms of Parasitic Pharyngitis known as "Halzoun" in the Middle East.** *J. Trop. Med. & Hyg.* 1956, July, v. 59, No. 7, 147–54.

The condition known as "halzoun" [this *Bulletin*, 1945, v. 42, 396] is relatively common in the higher parts of the Republic of Lebanon. It was first adequately described by Khoury in 1904 and 1905. He attributed the occurrence of the acute pharyngitis which constitutes the disease to the ingestion of young *Fasciola hepatica* by the eating of raw liver. The condition may be mild or more severe and then associated with dyspnoea which exceptionally proves fatal.

As doubt has been cast on the aetiology the authors investigated the case histories of 23 persons who had suffered from an attack of halzoun. In 2 the symptoms followed the drinking of spring-water and were due to infection by the leech, *Limnatis nilotica* [*loc. cit.*]. In the remaining 21 cases the symptoms followed the eating of raw liver of sheep or goats and were presumably due to infection by young specimens of *F. hepatica*. The authors undertook experimental work and confirmed the local experience and other experimental work that adult *F. hepatica* are unable to attach themselves to the mucosa of the pharynx and can be swallowed without symptoms of pharyngeal irritation arising. They did not have an opportunity to repeat the successful reproduction of the disease in rabbits, obtained by Khoury using very young *F. hepatica*, but they conclude that the clinical histories support Khoury's well-documented work and that Brumpt's failure to infect dogs using young *F. hepatica* does not negative Khoury's findings in rabbits and man who may be more susceptible.

Frederick J. Wright

URQUHART, G. M. **The Pathology of Experimental Fascioliasis in the Rabbit.** *J. Path. & Bact.* 1956, Apr., v. 71, No. 2, 301–10, 20 figs. on 6 pls. [12 refs.]

"From an examination of the pathological changes produced in the liver of rabbits experimentally infected with *Fasciola hepatica* it is suggested that the cirrhosis characteristic of hepatic fascioliasis is due to:—

(a) the healing of the migration tracts and infarcts produced by the flukes;

(b) chronic cholangitis resulting from the presence of adult flukes in the large bile-ducts;

(c) hyperplasia of both connective-tissue and biliary elements in the portal tracts;

(d) granulomatous lesions formed in response to the presence of fluke eggs in the tissues.

"Obstruction of the biliary tract appears to play no part in the pathogenesis of the hepatic cirrhosis met with in fascioliasis."

WELLS, W. H. & RANDALL, B. H. **New Hosts for Trematodes of the Genus *Heterophyes* in Egypt.** *J. Parasitology.* 1956, June, v. 42, No. 3, 287–92, 1 fig.

After briefly summarizing the literature on *Heterophyes*, the authors record the results of their examination of 23 species of fish-eating wild and domestic animals and 15 species of fish-eating birds collected in Egypt, with which some bats were included, because *Heterophyes heterophyes* has been recorded from the bat, *Rhinolophus clivosus acrotis*, in the Yemen.

The authors found 3 species, namely, *Heterophyes heterophyes*, *H. dispar* and *H. aequalis* (the diagnostic features of which are given, together with their hosts) in 4 out of 17 Egyptian kites (*Milvus migrans aegyptius*), in 73 out of 79 domestic cats, in 1 out of 7 wild cats (*Felis chaus nilotica*), in 15 out of 23 domestic dogs, in 3 out of 5 jackals (*Canis aureus lupaster*), in 11 out of 55 Egyptian foxes (*Vulpes vulpes aegyptiaca*), and in 1 out of 44 house rats (*Rattus rattus*). They give a long list of hosts in which *Heterophyes* was not found.

The metacercariae of *Heterophyes* spp. were found in the muscles of all the 7 species of fishes collected from brackish Egyptian lakes. These fishes were *Mugil cephalus* (grey mullet), *M. capito* (thin-lipped grey mullet), *M. auratus* (golden grey mullet), *Tilapia nilotica* and *T. zilli*, *Sciaena aquilla* (shadow fish) and *Solea vulgaris* (sole). *Sciaena aquilla* and *Solea vulgaris* are new host records for *H. heterophyes*, *H. dispar* and *H. aequalis*. All 3 species of mullet were heavily infected and the infection in *Mugil cephalus* and *Mugil auratus* was 100 per cent.

Metacercariae from 4 of the fish hosts were fed to puppies and egg-producing adults of *H. heterophyes*, *H. dispar* and *H. aequalis* were

recovered from the puppies, a greater number of adult trematodes being recovered from puppies fed with *Mugil auratus* than from those fed with the other fishes. This confirms the conclusions of other authors quoted that " the preferred second intermediate hosts " of species of the genus *Heterophyes* are fishes of the genus *Mugil* (mullet). *G. Lapage*

Lecuona, M. de O. Primeiros ensaios sobre a existência da teníase na Guiné Portuguesa e ensaio terapêutico com a Camoquina. [**First Investigations on the Existence of Taeniasis in Portuguese Guinea and Therapeutic Trials of Amodiaquine**] *Anais Inst. Med. Trop.* Lisbon. 1956, Mar.–June, v. 13, Nos. 1/2, 87–96.

The English summary appended to the paper is as follows:—

" We have realized a survey among the population of the area of the Administrative Post of Piche in order to determine the degree of infestation and the extension of endemics of the *Taenia saginata*.

" We have verified that the infestation is disseminated everywhere and it is not limited to outbreaks and results of infested were 6·5 per cent.

" We have obtained 95·6 per cent of cures with an essay of camoquin.

" We have concluded that the camoquin is, at this moment, the ideal drug for the mass treatment of the tapeworms which led us to treat so all the patients of this area."

Fain, A., Duren, P. & Fels, P. Cysticercose généralisée et plasmocytome médullaire (myélôme) associés chez une femme de race Muhutu. [**Generalized Cysticercosis and Myeloma in an African (Muhutu) Woman in the Belgian Congo**] *Ann. Soc. Belge de Méd. Trop.* 1956, June 30, v. 36, No. 3, 239–46, 4 figs. (3 on 2 pls.).

Ahumada, M., Díaz Muñoz, A. & Mazzotti, L. Utilidad de la administración previa de " Largactil " en los pacientes de teniasis tratados con acridínicos. [**Value of giving Chlorpromazine before treating Taeniasis with Acridines**] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1955, Dec., v. 15, No. 4, 233–4.

The English summary appended to the paper is as follows:—

" The administration of ' Largactyl ' before the treatment with acridinic drugs in cases of teniasis appears to be very effective to prevent nausea and vomit."

Mazzotti, L. & Torroella, J. Resultados negativos del Hetrazán en dos casos humanos de cisticercosis ocular. [**Failure of Diethylcarbamazine in Two Human Cases of Ocular Cysticercosis**] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1955, Dec., v. 15, No. 4, 217–19. English summary (2 lines).

DI BELLO, R. El electrocardiograma en la equinococosis cardíaca. Trabajo basado en 50 observaciones de la literatura mundial. [**The Electrocardiogram in Heart Echinococcosis**] *An. Facul. de Med. Montevideo.* 1956, Jan., Feb., Mar. & Apr., v. 41, Nos. 1/2, 16–45, 16 figs. [71 refs.] English summary.

LACROIX, A. C., JOUANNEAU, J. & THIODET, J. Les aspects de la prophylaxie de l'hydatidose en Algérie. [**Observations on the Prevention of Hydatid Disease in Algeria**] *Algérie Méd.* 1955, Mar., v. 59, No. 3, 229–34.

The authors state that Algeria shares with Argentina, Brazil and Uruguay the doubtful privilege of being one of the countries most heavily attacked by hydatid infection. Unfortunately accurate statistics are few, but the authors give some records from individual sources.

For example, in 51 cases treated surgically in military hospitals in Algeria between 1945 and 1950, there were 47 adult patients of whom 21 were Muslims. The lung was affected in 26 cases.

Radiological examinations in 1953 of 11,649 adults systematically studied by the School and University Service resulted in the discovery of 5 persons with pulmonary hydatid cysts: in 361,768 children, there were 56.

In animals, records are available from the results of some 3 million carcases examined at 8 abattoirs between 1950 and 1953. The percentage of animals showing hydatids varied between 29 and 46 in cattle and 50 and 81 in sheep from urban areas: sheep in rural areas showed a lower percentage, from 0·6 to 10·4 per cent.

Sheep are the principal animals raised in Algeria. They are moved about over great areas and vast numbers die on the way and are a source of infection of dogs. In two series totalling 172 dogs, the numbers infected were between 4 and 20 per cent.

The authors point out that while control of abattoirs is useful, it is of little value in the case of sheep dying en route. Educational measures are hampered by the scattered and nomadic nature of the people concerned. The most hopeful measure therefore seems to be the control of dogs, either by killing stray dogs or treating domestic animals regularly with anthelmintics. The establishment of mobile veterinary teams is suggested. *H. J. O'D. Burke-Gaffney*

BAER, Jean G. & SANDARS, Dorothea F. **The First Record of** *Raillietina* (*Raillietina*) *celebensis* **(Janicki, 1902),** (*Cestoda*) **in Man from Australia, with a Critical Survey of Previous Cases.** *J. Helminthology.* 1956, v. 30, Nos. 2/3, 173–82, 1 fig. [13 refs.]

The authors examined gravid cestode proglottides collected in 1955 from faeces of a child aged 20 months, in Brisbane, Queensland, and also tapeworms from *Rattus assimilis* (which ELLERMAN, *Proc. Zool. Soc.*

London, 1947, v. 117, 262, considers to be probably a race of *Rattus rattus*) from Mt. Glorious, Queensland.

The proglottides from the child were identified as those of *Raillietina* (*Raillictina*) *celebensis* and several of the tapeworms found in the rats also belonged to this species. Both these species are described and the features are given of other species of the genus *Raillietina* which are synonyms of *R.* (*R.*) *celebensis*. The authors have also found *R.* (*R.*) *cclebensis* in material from *Rattus norvegicus* from Hanoi. They conclude that the Australian child acquired the infection from normal rat hosts. This is the first time this species has been recorded from Australia from both a child and an autochthonous rat.

The authors discuss the taxonomy of *Taenia demerariensis*, *T. madagascariensis*, *Raillietina* (*Raillietina*) *madagascariensis* (which they consider to be still *sub judice*), *R.* (*R.*) *demerariensis*, *R. alouattae* and *R.* (*R.*) *trinitatae*.

They raise *R.* (*R.*) *demerariensis* var. *trinitatae* from the rank of a variety of *R.* (*R.*) *demerariensis* to the rank of a species now named *R.* (*R.*) *trinitatae* (Cameron and Reesal, 1951) *nov. comb.* They consider that *R.* (*R.*) *halli* Perez-Vigueras, 1943 is identical with *R.* (*R.*) *demerariensis* (Daniels).

They also give a key for the identification of *R.* (*R.*) *alouattae*, *R.* (*R.*) *trinitatae* and *R.* (*R.*) *demerariensis* with valuable diagnostic features of these species and of *R.* (*R.*) *celebensis*. *G. Lapage*

Hoekenga, M. T. **Experiments in the Therapy of Human Trichuriasis and Hookworm Disease.** *Amer. J. Trop. Med. & Hyg.* 1956, May, v. 5, No. 3, 529–33.

The author reports on the use of 13 different drugs or combinations of drugs in the treatment of trichuriasis and hookworm infection. These drugs include piperazine derivatives, hexylresorcinol, methylbenzene (toluene), Diphenthane with methylbenzene, activated papain, Phthalofyne (Whipcide), sodium santoninate and *leche de higuerón*. The author concludes that none is uniformly successful and still considers that the best results are obtained by the use of a mixture of tetrachlorethylene (2·7 ml.) and oil of chenopodium (0·3 ml.) or by hexylresorcinol as an alternative. He notes that Carr *et al.* [this *Bulletin*, 1955, v. 52, 60] have found that the adult dose of tetrachlorethylene, used by itself, can be increased to 4·0 or 5·0 ml. if no post-treatment purgation is given.

Frederick J. Wright

Pinto, A. R., Costa, F. C., de Meira, L. V. & Viana, J. P. **Effects of Tetrachlorethylene without a Purge, followed by Ferrous Sulfate in Ancylostomiasis.** *Amer. J. Trop. Med. & Hyg.* 1956, July, v. 5, No. 4, 739–41.

"The omission of the saline purge after treatment of hookworm infection with tetrachlorethylene, as recommended by Carr *et al.*, increases the effectiveness of the drug, shortens the time of treatment, and lowers its toxicity and cost. This method thus facilitates the administration of mass treatment and improves the possibility of curing the disease."

[See this *Bulletin*, 1955, v. 52, 60.]

Wallace, L., Henkin, R. & Mathies, A. W. *Trichostrongylus* **Infestation with profound Eosinophilia.** *Ann. Intern. Med.* 1956, July, v. 45, No. 1, 146–50, 2 figs.

"1. Two cases of trichostrongylus infestation with profound eosinophilia and marked leukocytosis are reported.

"2. One patient definitely contracted the disease in the United States, the second may have done so.

"3. The accurate differentiation of trichostrongylus ova from hookworm must be borne in mind if other cases are not to be overlooked."

Bueding, E. & Farrow, G. W. **Identification of Succinic Acid as a Constituent of the Perienteric Fluid of** *Ascaris lumbricoides*. *Exper. Parasit.* New York. 1956, July, v. 5, No. 4, 345–9. [15 refs.]

Bird, A. F. **Chemical Composition of the Nematode Cuticle. Observations of the Whole Cuticle.** *Exper. Parasit.* New York. 1956, July, v. 5, No. 4, 350–58, 1 fig. [26 refs.]

Macchia, A. & Previti, A. La curva da carico con acido nicotinico nei bambini con parassitosi intestinale. [**The Curve after a Loading Dose of Nicotinic Acid, in Children with Intestinal Parasites**] *Giorn. di Malattie Infettive e Parassit.* 1956, July, v. 8, No. 7, 265–8, 1 graph. [20 refs.]

The level of the circulating bilirubin is regarded as a satisfactory indicator of liver function, and in the healthy adult an intravenous injection of nicotinic acid causes a rise in the bilirubin which reaches a maximum after about 100 minutes and returns to normal after 5–8 hours.

As it is often found that children with intestinal parasites show some evidence of alteration of liver function, tests were carried out on 22 who had some intestinal helminth infection, other diseases being previously excluded. A dose of 25–30 mgm. of nicotinic acid diluted in 10 cc. normal saline was injected intravenously in the morning after a night's fasting. Samples of blood were taken before injection, and 90, 210, and 480 minutes after.

In 17 patients circulating bilirubin was normal, but 4 with *Ascaris*, and 1 with ankylostome infection showed some abnormality of either bile production or excretion. As a result the authors think that infection with these intestinal parasites in children may affect liver function. A number of references are given. *W. K. Dunscombe*

Makidono, J. **Observations on *Ascaris* during Fluoroscopy.** *Amer. J. Trop. Med. & Hyg.* 1956, July, v. 5, No. 4, 699–702, 3 figs.

"The distribution and behavior of *Ascaris* within the gastrointestinal tract has been observed by fluoroscopic methods. The jejunum is by far the favoured habitat of *Ascaris*. A slight preference for the middle third over the anterior and posterior thirds is evidenced by the worms. Resting positions and locomotion within the bowel are described. A characteristic position is assumed following administration of anthelmintics."

Kaplan, C. S., Freedman, L. & Elsdon-Dew, R. **A Worm in the Eye. A Familiar Parasite in an Unusual Situation.** *South African Med. J.* 1956, Aug. 18, v. 30, No. 33, 791–2, 2 figs.

"A case is reported in which an immature *Ascaris* appeared through the lacrimal canaliculus."

Hugon, J. Expérimentation du citrate de diéthylcarbamazine et de la paludrine dans les ascaridioses. [**Trials of Diethylcarbamazine and Proguanil in the Treatment of Ascariasis**] *Ann. Soc. Belge de Méd. Trop.* 1956, Apr. 30, v. 36, No. 2, 145–50.

The author used diethylcarbamazine to treat 100 children infected with *Ascaris*, some also being infected with hookworms. The drug was administered in a single dose, which was increased during the experiment from 6 mgm. per kgm. body weight to 14 mgm. per kgm. without serious side-effects. No dietetic changes are required but if the results are to be assessed accurately the child has to remain under observation for 4 days. *Ascaris* usually begin to be passed on the second day, sometimes being expelled *via* the mouth or nose. Observations on the stools indicated that 90 per cent. of cases are cured of *Ascaris*, but the hookworm infections are refractory.

The authors next tried the effect of proguanil [Paludrine] in doses of 30 mgm. per kgm. daily for 2 days; 20 children between the ages of 2 and 10 years were treated; 18 of them appeared to be freed of *Ascaris* by one treatment, the remaining 2 after a second treatment. Hookworms were again unaffected. The authors recommend that the use of Paludrine as an anthelmintic should be further explored. *Frederick J. Wright*

Yokogawa, M., Oshima, T., Sano, M., Kihata, M., Sato, S. & Komiya, Y. **Experiments in the Mass Treatment of Hookworm and Ascariasis. Expulsion of Young *Ascaris* Worms.** *Bull. Inst. Pub. Health.* Tokyo. 1956, Mar., v. 5, No. 2, 2–6, 2 figs. [12 refs.]

In the course of mass anthelmintic treatment of villagers infected with hookworms and *Ascaris lumbricoides* in Japan observations were made with particular reference to the effect of drugs on young *Ascaris* of less than 3·0 cm. in length. It was found that these young worms were less resistant to anthelmintics than larger worms and that most of them were passed after treatment much earlier than were the larger worms. There was a seasonal variation in the average number of young worms per person.

Frederick J. Wright

Karpinski, F. E., Jr., Everts-Suarez, E. A. & Sawitz, W. G. **Larval Granulomatosis (Visceral Larva Migrans).** *J. Dis. Children.* Chicago. 1956, July, v. 92, No. 1, 34–40, 2 figs.

"Two cases of 'visceral larva migrans' with positive identification of Toxocara larvae in liver biopsy specimens from both are presented.

"The actual animal host, a pet kitten which harbored the adult Toxocara, was incriminated in one of the cases.

"The pathogenesis and epidemiology of the syndrome is discussed, and the term 'larval granulomatosis' is proposed as a counterpart to 'visceral larva migrans.'"

Nichols, R. L. **The Etiology of Visceral Larva Migrans. I. Diagnostic Morphology of Infective Second-Stage *Toxocara* Larvae.** *J. Parasitology.* 1956, Aug., v. 42, No. 4, 349–62, 45 figs. on 4 pls. [18 refs.]

"*Toxocara canis* and *T. cati* larvae recovered from experimentally infected mice were studied *in toto* and in serial sections of infected organs. Measurements of 229 *T. canis* and 206 *T. cati* larvae from various tissues from 24 hours to 180 days following infection indicate that no development of either species occurs in the mouse, with the exception of slight growth of the excretory cell. *T. canis* larvae in the mouse are morphologically identical with those recovered in human infection.

"The length of both species of *Toxocara* pressed from the egg and recovered from experimental infections in mice, and of *T. canis* from one human autopsy, varied around 400 microns. The width of *T. canis* varied from 18 to 21 microns. For both larvae average measurements were: length of esophagus, 150 microns; distance from oral spine to excretory pore, 75 microns; and distance from anus to tip of tail, 38 microns.

"Larvae in tissue specimens regularly exhibit reduction in length amounting to approximately one-fifth of their heat-killed dimensions following standard procedures of dehydration and clearing in preparation for sectioning. Reconstructed larvae of both species have average lengths

of 320 microns. *T. canis* has a range in maximum diameter of 14 to 20 microns and *T. cati* 12 to 16 microns.

" The diagnosis of *Toxocara* larvae may be made on the basis of one good transverse section of the mid-gut level. Longitudinal sections or transverse sections at levels other than the intestine provide fewer species-exclusive characters and only infrequently permit identification from a single section."

Nichols, R. L. **The Etiology of Visceral Larva Migrans. II. Comparative Larval Morphology of** *Ascaris lumbricoides*, *Necator americanus*, *Strongyloides stercoralis* **and** *Ancylostoma caninum*. *J. Parasitology*. 1956, Aug., v. 42, No. 4, 363–99, 17 pls. [33 refs.]

" The comparative morphology of the tissue stages of *Ascaris lumbricoides*, *Necator americanus*, *Strongyloides stercoralis* and *Ancylostoma caninum* is described. These larvae can most easily be distinguished from each other and from second-stage *Toxocara* by features seen in transverse sections at the level of the mid-intestine. Specific diagnosis of all forms is based on the presence and size or lack of lateral alae and posterior excretory columns, the type of intestine and the relative diameter of the body.

" Although *A. lumbricoides*, *Strongyloides* and *N. americanus* larvae invade many different tissues during their normal migratory phase and are potentially capable of entering the systemic circulation, their behavior in experimentally infected abnormal hosts suggests that they are incapable of prolonged existence in human tissue.

" Similarities in behavior exhibited by *T. canis* and *A. caninum* larvae suggest the latter is also capable of producing visceral larva migrans in man. It is suggested that skin-penetrating larvae of the *A. caninum* type may be involved in the etiology of tropical eosinophilia."

Yoeli, M. [**A Survey of Filariasis among Indian Jews in Israel**] *Harefuah*. Jerusalem. 1956, Aug. 1, v. 51, No. 3 [in Hebrew 51–6, 5 figs. & 1 map. (10 refs.) English summary 56–7].

In 1953 Reitler and Yoffe examined for evidence of filariasis 1,904 Jews from Malabar who wished to emigrate to Israel [this *Bulletin*, 1955, v. 52, 1111]. They found clinical-anatomical signs of overt filariasis in 13·5 per cent. The present author, in Jerusalem between 1955 and 1956, has now examined 878 of 2,155 such Indian Jews who had mostly arrived and settled in Israel since 1953. He found that 102 (11·6 per cent. carried *Wuchereria bancrofti* and that all ages from 2½ years upwards were affected. Most of those infected were free from symptoms.

In Israel these Indian Jews live together in villages in the hills, and in the dry Negev in the south, but many have been absorbed into well-established settlements in other parts of the country. Study of the

conditions in the villages showed that the environmental factors favourable to transmission of filariasis were present. A few *Culex molestus* in dwellings of carriers in a hill village in the Jerusalem area were found to be infected with all stages of *W. bancrofti* and, in 3 laboratory experiments, a local strain of this mosquito gave infection rates of 65, 86·9 and 82·3 per cent.

Despite heavy *Culex* infestation and the presence of carriers, no infection by *W. bancrofti* was found in the night blood of 619 European members of 2 settlements among which the Indian Jewish immigrants had lived for 2 to 5 years.

It would appear that under the conditions prevailing in the modern settlements the chances of filarial transmission are small, but in some of the less hygienic homogeneous settlements occupied by the immigrants some local infections might occur.

A systematic course of treatment with diethylcarbamazine has been carried out by the Israel Ministry of Health. In one small group of 15 carriers, 2 weeks of treatment resulted in total suppression of microfilaraemia for 3½ months and partial suppression for 5 months. With this treatment and anti-mosquito measures, it is presumed that the disease will not spread and that eventually existing foci will be eliminated.

H. J. O'D. Burke-Gaffney

Minning, W. & McFadzean, J. A. **Serological Investigations in an Area of Endemic Filariasis due to *Wuchereria bancrofti* and *Acanthocheilonema perstans* in Gambia, West Africa.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1956, May, v. 50, No. 3, 246–54. [18 refs.]

The authors' summary is as follows:—

"(1) The complement-fixation test for filariasis was applied to 247 sera in Gambia, West Africa, where there is a high incidence of *W. bancrofti* and *A. perstans*.

"(2) The antigen employed was an alcoholic extract of dried *D. immitis* worms. When this antigen was tested in Hamburg against 55 sera from persons who had never left Europe, no false positive reactions were obtained.

"(3) In Gambia, out of 51 persons with microfilariae of *W. bancrofti* alone, 57 per cent. gave a positive reaction. Three possible explanations are given for the negative reactions in the remaining 43 per cent. of cases. These are:

"(*a*) That as the antigen employed was not homologous it failed in some cases to give an optimal reaction with the antibodies present.

"(*b*) That free antibodies might be absent periodically from the blood if they were adsorbed on to the microfilariae, or neutralized by an antigenic fluid from the adult worms, or if there was damage to the reticulo-endothelial system by metabolic products of the parasites.

" (c) That as the parasites are so well adapted to their host, there is sometimes a poor level of production of antibodies.

" (4) Of 24 persons with microfilariae of *A. perstans* alone, 25 per cent. gave a positive reaction.

" (5) Of 13 persons with both microfilariae of *W. bancrofti* and *A. perstans*, 23 per cent. gave a positive reaction.

" (6) Of 159 persons who lived in the endemic area studied, but had no microfilariae in the blood, 33 per cent. gave a positive reaction.

" (7) Comparison is made between the results obtained in the present investigations and those reported by other observers."

[It will be seen from the results of these interesting and carefully controlled experiments that they again demonstrate the difficulty of correlating the results of serological tests with clinical diagnosis founded, for the most part, on the presence or absence of microfilariae in the patient's peripheral blood. When commenting on the high—33 per cent.—proportion of persons giving a positive CFT but in whose blood no microfilariae were found, the authors write " The question of whether in Gambia an infection with human filariae was the cause of the positive C.F.T. in every one of the 33 per cent. of the cases without microfilariae which gave a positive response, is difficult to answer definitely. It appears that this was probably the case. However, theoretically animal filariae might be responsible for a positive reaction in a number of these cases (the infection rate of *Setaria* in cattle in Gambia is high, approximately 40 per cent.). Animal filariae, for which man is not the proper host, and which could not become sexually mature in man could possibly provoke group-specific antibody reactions ". It is possible, of course, that the fixation of complement was caused by the previous invasion of the human host by " animal filariae ", but it seems, to the abstracter, more likely to have been caused by the presence of *Wuchereria bancrofti*, the microfilariae of which were not detected because the authors examined too small a quantity of blood. In this connexion it should be remembered that the figure 33 *per cent.* negative is founded on the examination of " at least 20 c.mm. of blood ". Gordon and Webber [this *Bulletin*, 1955, v. 52, 811] have shown that whereas 47 out of 65 persons (72 per cent.) examined at Sapele in Nigeria failed to reveal the presence of microfilariae when 50 cmm. of their blood was examined only 35 (54 per cent.) remained negative when a larger quantity of their blood was examined by means of a concentration technique.] *R. M. Gordon*

I. Jordan, P. **Filariasis in the Eastern, Tanga and Northern Provinces of Tanganyika.** *East African Med. J.* 1956, June, v. 33, No. 6, 225–33, 1 map. [10 refs.]

II. ————. **Filariasis in the Western Province of Tanganyika.** *Ibid.*, 233–6, 1 map.

III. Jordan, P. **Filariasis in the Lake Province of Tanganyika.** *Ibid.*, 237–42.

I. This paper continues the author's surveys in Tanganyika [this *Bulletin*, 1954, v. 51, 199; 1955, v. 52, 467]. No results can be given for Masailand as the tribal elders refused permission for night bloods to be taken from members of their tribe.

The geography of the region is very variable, from the low-lying coastal regions of the Tanga and Eastern Provinces to the Central Plateau, the Ngorongoro Crater and the Lakes Manyara and Eyasi. The climate varies according to the elevation from a mean maximum of 80°F. to 85°F. The mean annual rainfall varies between 40 and 50 inches along the coast to the dry Plateau.

The distribution of bancroftian filariasis is affected by temperature and there is generally a higher incidence on the coastal areas than in the hinterland. The local conditions on Mafia Island, 20 miles from the mainland and opposite the Rufiji Delta, produce a microfilaraemia incidence of 30 to 40 per cent. (in males only), while on the mainland opposite only 10 to 20 per cent. was found. On Ukara island, Lake Victoria, a rate of 40 per cent. was recorded. The incidence of filariasis in the highland area is very much lower and it appears that in these parts of Tanganyika bancroftian filariasis does not occur higher than 4,500 feet above sea-level. Low rates at high altitudes are due to a combination of circumstances. Probably the lowered water content of the air together with low prevailing temperatures militate against the development of infection in mosquitoes. Elephantiasis of the legs, arms and scrotum, hydrocele and lymph scrotum constitute the late manifestations. Lymphostasis verrucosis complicated a number of cases of elephantiasis of the legs. Scrotal elephantiasis, though common in coastal regions, becomes less frequent inland though other manifestations of filariasis are encountered. High rates of elephantiasis were found at Mlalo and Mwangoi in Tanga Province; 1·6 and 2·4 per cent. respectively. Children with elephantiasis contract it at an early age. Four children were seen in ages from 8–13; two came from the same family. On Mafia Island the incidence of microfilaraemia in Asians living in the same villages as Africans was lower than in the Africans and was probably due to anti-mosquito measures which they employ. In Asians the percentage was 10, in Africans 26.

II. The Western border of this Province is formed by Lake Tanganyika at an altitude of 2,500 feet. Apart from highlands in the south and in Kasulu and Kibondo Districts in the north, where villages at 5,000 feet were visited, the greater part of the Province is at 4,000 feet. Mean maximum temperatures range from 80–85°F. and mean minimum from 60–65°F. The mean rainfall is 30–40 inches over most of the area with a maximum of 50–60 inches.

No extensive focus of either *Wuchereria bancrofti* or *Dipetalonema*

perstans was found and the few cases of the former were seen in localities adjacent to larger endemic foci in the Lake Province. The few persons with positive bloods at Kigoma may indicate a small independent focus or people may have acquired infection elsewhere. The highest incidence in children was at Kigoma with 2 per cent. and in adult males at Tura village in Tabora with 5 per cent.

At Mabamba (Kibondo District) the incidence of *D. perstans* was 10 per cent. in children, 37 per cent. in males and 9 in females.

III. The total land area of the Lake Province is 39,000 square miles and includes all the Tanganyika shores of Lake Victoria at an altitude of 3,720 feet. To the west the Province borders onto the Belgian Trust Territory of Ruanda-Urundi and reaches heights up to 8,000 feet. To the south the Province borders on the Western Province.

The area south and south-east of Lake Victoria is mainly occupied by the Wasukuma tribe. Most of this region is just above the level of the lake. A large area is uninhabited and forms the Serengeti National Game Park.

Considerable differences in rainfall occur. The lakeside area of Bukoba experiences an annual rainfall of over 80 inches and this gradually decreases towards the Ruanda border.

The incidence of microfilaraemia is given, village by village and for both sexes. It varied from 1 to 40 per cent. In none of the islands of Lake Victoria was a high rate discovered, except in Ukara Island, where 45 per cent. were found infected in some villages.

In the north-east and north there was no filariasis, but to the south and south-east of Lake Victoria bancroftian filariasis is endemic, while to the south and west of the Lake *D. perstans* was found. In Shinyanga in the south the rate was 40 per cent. in males and 33 per cent. in females. Bancroftian infection is accompanied by a variable incidence of filarial disease depending upon that of microfilaraemia, but in those village groups in which the highest elephantiasis incidence was found there were no microfilariae of *W. bancrofti*. This anomaly deserves some clarification.

It is quite common to find a very low infection rate close to a place with a high filarial rate as in Ukerewe and Ukara Islands. Considerable differences were noted in two villages, only 3 miles apart. Smith [this *Bulletin*, 1956, v. 53, 466], as the result of extensive study, endeavoured to explain the anomaly on the basis of the density of *Anopheles gambiae* and *D. perstans* in the two places. *Philip Manson-Bahr*

Germán Olivier, A. La incidencia de filariasis en los pacientes del Hospital Dr. William Morgan. [**Incidence of Filariasis in Patients in the William Morgan Hospital, Dominican Republic**] *Rev. Med. Dominicana.* 1954, Apr.–May–June, v. 9, No. 2, 69–73.

In 8 months the author examined for microfilariae the blood of 896 patients in the William A. Morgan Hospital in Ciudad Trujello,

Dominican Republic: 43 (4·8 per cent.) were positive, nearly three-quarters being males. Similar studies of 41 members of the hospital staff revealed 2 positives, a comparable proportion. Most of the patients had been admitted for general diseases and injuries and rarely were symptoms found which could be attributed to filariasis. Most of the patients showing microfilaraemia came from Ciudad Trujello, but this was not held to be significant. The parasite incriminated was *W. bancrofti*.

H. J. O'D. Burke-Gaffney

South Pacific Commission. Noumea, New Caledonia. **Mosquito-Borne Diseases: Filariasis. Studies on Filariasis in New Caledonia** [Iyengar, M. O. T. & Menon, M. A. U.]. *Technical Information Circular No. 15.* 1956, Mar., 3 mimeographed pp.

Aëdes vigilax, *A. notoscriptus*, *A. aegypti*, and *Culex fatigans* were fed in the laboratory in New Caledonia on a carrier of non-periodic *Wuchereria bancrofti* with 26 to 148 microfilariae per 20 cmm. of his blood. The single specimen of *A. aegypti* which gorged contained only dead or poorly developed larvae in the thorax 16 days later. *A. vigilax*, *A. notoscriptus*, and *C. fatigans*, however, harboured active infective larvae in the head and thorax by the 13th and 15th day. Infection rates for all stages of larval development were, respectively, 94 per cent. of 84 specimens, 72·2 per cent. of 18 specimens, and 95·8 per cent. of 48 specimens. *A. vigilax* has been found infected in nature in endemic areas of the island; it appears to be the vector as neither of the other two species shown to be susceptible in these experiments occurs in large numbers in the endemic areas. *D. S. Bertram*

Yoeli, M. [**On an Agglutination Phenomenon of Microfilariae occurring in Blood of** *Wuchereria bancrofti* **Carriers**] *Harefuah.* Jerusalem. 1956, Aug. 1, v. 51, No. 3 [in Hebrew, 63–6, 4 figs. English summary 67].

The English summary appended to the paper is as follows:—

"Agglutination of microfilariae was observed *in vitro* in venous blood obtained from 13 *Wuchereria bancrofti* carriers, recent immigrants from Cochin, India.

"The agglutinated masses of the microfilariae showed a distinct pattern, with the tails of the larvae directed towards the center of the mass and heads towards the periphery.

"A marked depletion in the number of free microfilariae in the blood was noticed after agglutination and thigmotaxis took place.

"A strict relation between the occurrence of the agglutination phenomenon and the amount of anticoagulant (heparin) added to the drawn blood, was clearly established. Intravenous injection of heparin

during daytime partially releases microfilariae of *W. bancrofti* into the peripheral blood for a short time.

"From the preliminary experiments it is presumed, that microfilariae gather together in the capillaries and other vessels of the lung during their absence from the peripheral blood, by the power of agglutination and thigmotaxis. The mechanism responsible for these periodic phenomena originates in cyclical changes in the blood and in fluctuations of blood coagulation reactions occurring during periods of work and rest."

Ridley, D. S. **The Complement-Fixation Test in Filariasis.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1956, May, v. 50, No. 3, 255–7.

"The majority of patients reaching this country with filariasis are seen, and investigated, before the advent of microfilariae has established the diagnosis." In order to meet the demand for a diagnostic test which could be applied during this early stage of infection, the author made a reappraisal of Fairley's complement-fixation test, using *Dirofilaria immitis* as a group antigen [this *Bulletin*, 1931, v. 28, 679]. "As a result of clinical and laboratory investigations 142 cases were diagnosed with a high degree of probability as having filariasis of one sort or another, although only 63 were proved by the finding of microfilariae or adult worms; and in five the type of filariasis could not definitely be specified." Of these 142 presumably positive cases of filariasis 80 (56 per cent.) gave a positive CFT. The author considers that "The only really satisfactory results are in loiasis (85 per cent. positive). The superiority of the results in this class is sufficient to indicate that the positives are in fact due to *Loa loa* and not to animal infection." [It is nowhere stated what proportion of persons diagnosed as suffering from a particular species of filarial infection, but in whose blood microfilariae of that species were not found, gave a positive CFT.]

"It is concluded that *D. immitis* antigen gives a group reaction but that the incidence of positives is not equal for all types of filariasis, being greatest in loiasis, and lowest in cases of bancroftian infection."

R. M. Gordon

Thooris, G. C. Étude sur l'étiologie de la lymphangite aiguë dans la filariose à *Wuchereria bancrofti*. [**A Study of the Aetiology of Acute Lymphangitis in Filariasis due to** *W. bancrofti*] *Bull. Soc. Path. Exot.* 1956, Mar.–Apr., v. 49, No. 2, 317–29, 3 charts & 1 fig. [22 refs.]

The most popular theory regarding the causation of acute filarial lymphangitis is that it is allergic in origin. Thooris believes that there are really two varieties; one due to filarial toxins, while the other, which begins in the region of a "focal spot" producing a localized oedema, and which may develop into an abscess, is bacterial. The most typical attacks are seen in the newcomer after 6 months' residence in the

endemic area, while the local inhabitant, born in the region, rarely suffers in this manner. Abscess formation is in reality a proof of the death of the adult filaria and streptococci are the agents of suppuration. The presence or absence of microfilariae in the blood do not help to clear up this problem one way or another as subjects of elephantiasis rarely have microfilaraemia, and, *per contra*, well-known carriers of microfilariae may never suffer from lymphangitis. The same uncertainty appertains to the intradermal reaction with *Dirofilaria immitis* antigen, which is positive in 56 per cent. of the population of French Oceania, and a reactor to this test is also susceptible to bacterial invasion.

The author examined 45 patients with acute lymphangitis and adenitis during the acute onset; cultures were made from aspirated gland juice and from blood. A preliminary injection of 1 cc. of distilled water was made into the glands to facilitate aspiration. The cultures were kept for 10 days before being rejected as sterile. In 23 blood cultures a streptococcus was isolated once and a diphtheroid once; the rest were sterile. In 22 lymph cultures a streptococcus and a staphylococcus were isolated once each. It appears almost certain from these results that a septic element is normally absent.

The presence or absence of microfilariae did not seem to exert any influence on the blood formula. All patients exhibited an eosinophilia, particularly in the acute stage.

The majority of patients were treated initially with intramuscular injections of 600,000 to 800,000 units of penicillin, with 2·5 gm. of oxytetracycline for one to two days, or with antihistamines.

Considering the duration (1–7 days) and variable severity of the attacks it became very difficult indeed to adjudicate upon the different forms of treatment; 72 cases of lymphangitis were given penicillin and 10 oxytetracycline without any particular effect. Among the many antihistamines, preparations known as Tagathen and Pyribenzamine were retained as being well tolerated. The classical and ancient remedy, aspirin in moderate doses, appeared to be the best, and terminated the fever at the end of a few hours.

The allergic reactions which sometimes occur after the primary courses of diethylcarbamazine are also amenable to this treatment. These results, in view of the inefficiency of antibiotics, are in favour of the allergic theory.

Prophylactic treatment with diethylcarbamazine in various schedules was tried with the idea of preventing onset of lymphangitis. The dose finally adopted was 6 mgm. per kgm. on one day each month, and the results in 2,153 persons were:—Prior to treatment there were 1,766 crises or 0·82 per person per annum. After one year's treatment the number was 1,140 or 0·53 per person per annum. After two years' treatment the number was reduced to 0·26 and after 4 years there were 228 crises, or 0·13 per person per annum.

With desensitization by extracts of *Dirofilaria immitis* the author had

more success. In a series of 43 patients with a mean average of 1·7 crises a month desensitization with intradermal injections of antigen in increasing concentration reduced the number of crises by 90 per cent. at the end of 5 months.

Sodium thiacetarsamide was tried and also suramin (Antrypol). In a series of 35 patients with 0·75 crises per month the former drug in doses of 6 cc. intravenously for 15 days reduced the number to 0·4 after 3 months, the microfilariae disappearing slowly. Suramin in weekly doses of 1 gm. for 7 weeks, reduced the number to 0·37 at the end of treatment and the microfilariae disappeared, but more slowly than with sodium thiacetarsamide. *Philip Manson-Bahr*

Foster, D. G. **Filariasis—a Rare Cause of Pericarditis.** *J. Trop. Med. & Hyg.* 1956, Sept., v. 59, No. 9, 212–14.

"Parasitic infestation of the human heart or pericardium is rare. In a fatal case of pericarditis numerous microfilariae were found in the exudate. The larvae were not specifically identified as an autopsy was not permitted. Circumstantial evidence indicates that *Acanthocheilonema perstans* may have been the nematode involved. This is believed to be the first case of this kind to be reported."

Hawking, F. **The Periodicity of Microfilariae. IV. Stimuli affecting the Migration of the Microfilariae of** *Dirofilaria aethiops*, *D. immitis*, *D. repens*, *Dipetalonema blanci* **and** *Litomosoides carinii*. *Trans. Roy. Soc. Trop. Med. & Hyg.* 1956, July, v. 50, No. 4, 397–417, 12 figs. [10 refs.]

In a previous paper [this *Bulletin*, 1952, v. 49, 1141] Hawking and Thurston showed that the diurnal disappearance of certain microfilariae from the peripheral blood is due to their accumulation in the small vessels of the lungs. The present paper describes an investigation, in infected monkeys, dogs and other animals, of the stimuli which cause the microfilariae to enter or leave the peripheral blood. Changes were produced in the internal environment, *e.g.*, oxygen pressure, acidity, etc., of the animal by day, and the effects of this change on the number of microfilariae in the blood were observed; similar experiments were carried out by night.

In infection with *Dirofilaria aethiops* in the monkey, a rise of the count (*i.e.*, migration from the lungs to the peripheral blood) is caused by increase or decrease of the oxygen pressure and by anaesthetics (day or night); a moderate rise during the day is caused by increase of the carbon dioxide pressure or by infusion of ammonium chloride; a fall in the count at night (*i.e.*, migration from blood to lungs) is caused by hyperventilation, by exercise and by infusion of ammonium chloride or sodium bicarbonate.

In infection with *D. immitis* and *D. repens* in the dog, a rise in the microfilarial count is caused by increase or decrease of the oxygen pressure and by anaesthetic (day or night) and a fall is caused by hyperventilation (*D. immitis*, at night).

In infection with *Dipetalonema blanci* in the gerbil, a rise in the microfilarial count is caused by increased oxygen or by anaesthetic; but in infection with *L. carinii* in the cotton rat, these stimuli have no effect or cause a fall, respectively.

It is concluded that, at the present time, it is difficult to frame an explanation of the phenomena observed. *W. E. Kershaw*

Wagner, W. H. Modellinfektionen in der experimentellen Chemotherapie der Filariosen. [**Laboratory Infections for Experimental Chemotherapy of Filariasis**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1956, June, v. 7, No. 2, 163–77, 6 figs. [Numerous refs.]

A good review is given of laboratory techniques for handling infections of *Litomosoides carinii* in cotton rats, and also of *Dipetalonema blanci* in gerbils, *Icosiella neglecta* in frogs and *Dirofilaria immitis* in dogs. A useful bibliography is given. The original should be consulted by those interested, as it is not suitable for reproduction in an abstract.

F. Hawking

Lecuona, M. de O. Nota prévia sobre a existência da oncocercose na Guiné Portuguesa (primeiro caso registado). [**The First Reported Case of Onchocerciasis in Portuguese Guinea**] *Anais Inst. Med. Trop.* Lisbon. 1956, Mar.–June, v. 13, Nos. 1/2, 83–5, 3 figs. on 2 pls. English summary (2 lines).

Lapeyssonnie, L. Note sur un foyer d'onchocercose cutanée découvert à l'occasion d'opérations de séro-dépistage des tréponématoses en A.O.F. [**A Focus of Cutaneous Onchocerciasis discovered during Serological Surveys for Treponematosis in French West Africa**] Reprinted from *Arch. Malad. de l'Appareil Digestif.* 1954, v. 81, No. 6, 644–51, 3 figs.

As the result of an investigation designed to ascertain the relative value of different serological tests in treponematoses occurring in Africa, the author concluded that certain cases bore a superficial resemblance to yaws but being sero-negative, without treatment, must have been examples of a different disease, locally also distinguished by special names. Three years later an African from French Guinea was recognized by the author in France as suffering from the same condition. This case yielded microfilariae of *Onchocerca volvulus* in skin snips, more numerous

in recent lesions than in older ones. [The author concludes that serological control is necessary if mistakes are to be avoided but does not discuss the possible co-existence of a treponematosis and onchocerciasis.]

Frederick J. Wright

Lewis, D. J. **Biting Times of Parous and Nulliparous** *Simulium damnosum*. [Correspondence.] *Nature*. 1956, July 14, v. 178, 98–9.

This preliminary note reports that both in the Sudan and in Sierra Leone the proportion of *Simulium damnosum* which were infected with *Onchocerca volvulus* was higher among flies biting during the morning than in those biting in the afternoons; there was a corresponding predominance of older flies during the mornings, as shown by the state of the female genital organs and by other criteria. Some implications are briefly outlined. A fuller account is to follow elsewhere.

D. S. Bertram

Onabamiro, S. D. **The Effects of Hetrazan** (*Banocide*), **Diethylcarbamazine on the Larval Forms of** *Dracunculus medinensis*. *West African Med. J.* 1956, June, v. 5 (n.s.), No. 2, 64–70, 1 fig. [10 refs.]

Diethylcarbamazine in concentrations from 1 to 20 per cent. was tested *in vitro* at 30°C. upon fresh larvae of *Dracunculus medinensis* and upon first-, second- and third-stage larvae enclosed inside cyclops. The times required to produce slowing of movement, and death, were measured. Even strong concentrations of drug had only a slow effect on freshly discharged larvae, *e.g.*, 20 per cent. diethylcarbamazine took 17 hours to kill. A 1 per cent. solution had a very weak effect on all stages; but 5 per cent. solution had more pronounced effects, killing second-stage larvae inside cyclops in $3\frac{1}{4}$ hours. The second-stage larvae were more susceptible than the other stages. The larvae in the infective stage were killed by a 20 per cent. solution in $1\frac{2}{3}$ hours.

[Diethylcarbamazine citrate is strongly acid; no mention is made whether it was neutralized. The action of diethylcarbamazine upon microfilariae depends largely on cooperation by the cells of the host; in the present experiments these were not available. Probably diethylcarbamazine may be more active against guinea worm *in situ* than these results would suggest.]

F. Hawking

Hoekenga, M. T. **Ocular Toxicity of Whipcide (3-Methyl-1-Pentyn-3-yl Acid Phthalate) in Humans.** *J. Amer. Med. Ass.* 1956, July 28, v. 161, No. 13, 1252–3.

"Whipcide (3-methyl-1-pentyn-3-yl acid phthalate) was given to 143 Honduran adults with Trichuris trichiura infections. With daily orally given doses of 20 to 145 mg. per kilogram of body weight for four or five

days, the drug was only 22% effective. With single doses of 100 to 200 mg. per kilogram, a 50% cure rate was achieved, but 9·5% of the patients developed conjunctivitis and keratitis. With single doses of more than 200 mg. per kilogram in seven patients, the cure rate went up to 100%, but, unfortunately, so did the rate of ocular complications."

[Whipcide is used in veterinary medicine against dog whipworm.]

CARTER, C. H. & MALEY, M. C. **Institutional Prophylaxis of Enterobiasis.** *Amer. J. Trop. Med. & Hyg.* 1956, May, v. 5, No. 3, 534–7.

The authors briefly review the literature on the treatment of enterobiasis. They thought that a small amount of a drug given periodically for a long period might control enterobiasis in an institution in which the prevention of re-infection was impossible. The drug chosen for trial was piperazine citrate. This was given to 40 selected patients (all children weighing over 75 lb.). An untreated group acted as controls. Cellulose tape swabs were taken 3 hours before the patients went to bed. This procedure was repeated by the same person every evening for 10 days and the swabs were examined by the same technician daily (excepting Sundays). Of the 40 patients 37 were positive at least once and 25 were adjudged heavily infected, having 10 of more eggs per microscopic field.

Treatment of the 37 positive patients began with 1 gm. piperazine citrate (= 1 gm. piperazine hexahydrate) twice daily. There were no side-effects.

After 6 days of this treatment swabs were taken daily for 14 days and again 3 weeks after the end of the treatment. Any child with one positive swab was considered to be positive. Table 1 shows that the cure rate in this group was 67·5 per cent.

The children were then given 1 gm. piperazine citrate twice daily for 2 consecutive days of each week for 14 months. No side-effects were noted. Blood counts, urine tests, monthly weighing, etc., were done, but no special methods of avoiding re-infection were used. The patients were first checked 3 months after treatment began and the checks were repeated each month, swabs being taken each night for 6 nights. The results were:

at 3 months: 37 negative; 3 with abnormal eggs; cure rate 91 per cent.;
at 4 months: 2 with few abnormal eggs;
at 5 months: 1 with few abnormal eggs; this patient was treated with piperazine citrate for 6 days.

All later tests were negative in all patients and treatment was discontinued. The untreated control group retained an almost constant infection rate of 85 per cent.

A third group of patients with an initial infection of 80 per cent. were given an initial but insufficient treatment with sulphathiazole for 6 days

and the cure rate was then 45 per cent., but 6 months later this ward had an infection of 75 per cent.

A fourth group of 6 patients in another ward with a 75 per cent. infection were given 2 gm. piperazine citrate once a week for a year and were checked as the first group were. They were all negative at the end of 4 months and remained uninfected for the rest of the year; but treatment of this group has been stopped and two of them are again infected.

G. Lapage

Sawitz, W. G. & Karpinski, F. E., Jr. **Treatment of Oxyuriasis with Pyrrovinyquinium Chloride (Poquil).** *Amer. J. Trop. Med. & Hyg.* 1956, May, v. 5, No. 3, 538–43.

The authors briefly summarize the literature on the cyanine dye, pirrovinyquinium chloride (Poquil), which is more effective than gentian violet against the oxyurids of mice and is well tolerated by mice. The chemistry and toxicology of the dye are described.

The authors gave it to 45 out of 123 patients (mostly children) who gave 3 positive cellulose-tape swabs, which was the criterion of infection adopted, 7 negative swabs being used as the criterion of cure. No precautions against re-infection were advised. The drug was given to 105 of these patients, 15 of the remaining 18 were infected and 3 of these (20 per cent.) showed spontaneous cure.

The 105 patients were treated as follows:

(a) An aqueous, raspberry-flavoured suspension of the dye in which, to avoid intestinal irritation, half the dye granules were coated with a cellulose-acetate phthalate type of coating, was given to 33 patients, the dose being 1 mgm. per kgm. body weight 3 times a day for 6 days. No intestinal disturbance resulted. Of the 33 patients 10 had given 3 or more positive swabs and all 10 became negative on the 3rd to the 8th day. The other 23 did not fulfil the criterion of infection, but " no failure " was observed in them.

(b) A similar suspension in which all the dye granules were uncoated was given to 33 patients, the dose being 0·5 mgm. per kgm. thrice daily for 6 days. Of these, 17 were infected and all 17 became negative from the 2nd to the 8th day.

(c) The uncoated suspension was also given to 39 patients, of whom 18 were infected and all these 18 became negative from the first to the 7th day. The dose given to this group was 0·7 mgm. per kgm. thrice daily for 6 days.

Thus of the 45 patients treated all became negative. In 27 of them examined often and long enough, eggs were again found in 22 from 40 days after treatment onwards. A second treatment freed these patients for 46 days.

Of the total of 105 patients treated, 103 showed no side-effects, but

one 6-year-old girl had headache, and a woman with Hodgkin's disease, who had had penicillin, actinomycin C and a blood transfusion, complained of nausea, flatulence and " sore intestines " and had urticaria on the forearms and chest.

The authors discuss the difficulties presented by *Enterobius* and claim that the dye used gives 100 per cent. efficacy. *G. Lapage*

Avery, J. L. **Treatment of Enterobiasis with One Oral Dose of Promethazine Hydrochloride.** *J. Amer. Med. Ass.* 1956, June 23, v. 161, No. 8, 681–3.

Promethazine hydrochloride (Phenergan) in a single dose of 125 mgm. was administered at night without other medication to 100 patients infected with *Enterobius vermicularis*. The patients were mostly between 3 and 12 years of age. For small children the tablets were crushed in jelly or syrup. Anal swabs taken 10 days after treatment showed that 97 of the patients were free from ova on repeated examination. After 53 days to several months " a number " of patients again became positive. These were considered to be re-infections.

No serious side-effects were observed. None of the patients reported drowsiness on the morning after treatment—this included one man who inadvertently took 250 mgm. of the drug. Nightmares of an unusual belligerent character occurred in 5 per cent., for which the author advises a hypnotic.

The author concludes that promethazine affords an inexpensive, non-toxic, one-dose oral treatment for enterobiasis.

[The author points out that much larger doses of promethazine have been employed in the treatment of certain mental disorders. He does not state which hypnotic can be advised for the nightmares.]

Frederick J. Wright

Rausch, R., Babero, B. B., Rausch, R. V. & Schiller, E. L. **Studies on the Helminth Fauna of Alaska. XXVII. The Occurrence of Larvae of *Trichinella spiralis* in Alaskan Mammals.** *J. Parasitology.* 1956, June, v. 42, No. 3, 259–71. [28 refs.]

Mazzotti, L., Sandoval, F. & Briseño, Clemencia. Conservación experimental de los quistes de *Trichinella spiralis* en diversas sustancias químicas. Su aplicación en el estudio de esa parasitosis en el cerdo u otros mamíferos. [**Experimental Preservation of *Trichinella* Cysts in Different Chemical Agents**] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1955, Dec., v. 15, No. 4, 205–12. 3 figs.

The English summary appended to the paper is as follows:—

"Experimental studies were made to find a preservative able to preserve muscle samples so as to collect them through several days or weeks and to send them thereafter to a specialized laboratory to examine them for *Trichinella spiralis* infection.

"Diethanolamine and ethanolamine diluted in water were found to give better results than boric acid or glycerin, well known preserving agents.

"Diethanolamine or ethanolamine diluted at 50%, may be used to examine samples of ham or some other preserved pork products."

KAGAN, I. G. & BARGAI, U. **Studies on the Serology of Trichinosis with Hemagglutination, Agar Diffusion Tests and Precipitin Ring Tests.** *J. Parasitology.* 1956, June, v. 42, No. 3, 237–45, 4 figs. [17 refs.]

"Rabbit and rat sera obtained after infection with *Trichinella spiralis* were tested for agglutinins with Boyden's hemagglutination test (Boyden, 1951). The antigen employed to coat sheep red cells was Melcher's acid-soluble larval antigen (Melcher, 1943). These same sera were tested with precipitin ring tests utilizing Melcher's antigen and a saline extract of trichina larvae. Agar double diffusion tests (Oakley and Fullthorpe, 1954) modified by Preer (unpublished) were made with Melcher's antigen.

"Rabbits became positive by hemagglutination 6–15 days after infection. The hemagglutination test was more sensitive than the precipitin ring test in detecting antibody early in infection.

"Melcher's antigen was superior to saline extracts of trichina larvae in the ring test since it detected antibody earlier in infection and in one instance was positive when the saline antigen was negative.

"Agar double diffusion tests indicate that a minimum of three antigenic components are present in Melcher's antigen."

WEINER, L. M. & PRICE, Stella. **A Study of Antigenic Relationships between** *Trichinella spiralis* **and** *Salmonella typhi.* *J. Immunology.* 1956, Aug., v. 77, No. 2, 111–14.

[See this *Bulletin*, 1953, v. 50, 962.]

DEFICIENCY DISEASES

GUZMÁN BARRÓN, A. Estudios de nutrición en el Perú. [**Studies on Nutrition in Peru**] *Archivos Venezolanos de Nutrición.* 1954, Dec., v. 5, No. 2, 263–84. [35 refs.] English summary.

VAN DER SAR, A. & KROON, T. A. J. **Avitaminosis A and Subclinical Vitamin C Deficiency in Curaçao.** *Documenta Med. Geograph. et Trop.* Amsterdam. 1956, June, v. 8, No. 2, 144–50, 3 figs. [15 refs.]

Clinical details are given of 10 children with follicular hyperkeratosis (phrynoderma or toadskin). The condition is attributed to vitamin A deficiency on account of a poor dietary history and a low fasting level of vitamin A in the blood (50–100 IU/100 ml.). Most of the patients responded favourably to cod-liver oil. The vitamin C content of the blood was also usually low. *R. Passmore*

WOODRUFF, C. **Infantile Scurvy. The Increasing Incidence of Scurvy in the Nashville Area.** [Report to the Council on Foods and Nutrition, (STEVENSON, E. H., Acting Secretary).] *J. Amer. Med. Ass.* 1956, June 2, v. 161, No. 5, 448–56, 6 figs. [18 refs.]

This paper reviews the case records of 103 patients with infantile scurvy seen between 1926 and 1954 at the Vanderbilt University Hospital, Nashville, Tennessee. Most of the paper is taken up with an account of the clinical features, radiological and biochemical findings and treatment of the disease. This is well done and can be recommended to those unfamiliar with the disease. Experienced persons are, however, unlikely to find anything new.

The interesting feature of the report is the fact that the incidence of the disease is increasing. Quinquennial incidence was as follows:—

1926–34: 8 cases
1935–39: 11 cases
1940–44: 15 cases
1945–49: 24 cases
1950–54: 45 cases

There was during this period a decline in the total number of paediatric cases seen at the hospital and the author is in no doubt that the increase in scurvy is real. This is attributable to failure to ensure an adequate intake of ascorbic acid rather than unavailable sources of suitable foods. [Unfortunately there is little discussion here of the reasons for the failure and of the public health and educational problem that infantile scurvy presents. The paper comes as a valuable reminder that there should be no relaxation of precautions against the disease.] *R. Passmore*

MODESTO PORTILLA, J. Síndrome pluricarencial infantil. [**Multiple Deficiency Syndrome (Kwashiorkor) in Children**] *Archivos Venezolanos de Nutrición.* 1954, Dec., v. 5, No. 2, 463–7.

The English summary appended to the paper is as follows:—

" The author presents the first 5 cases of multiple deficiency syndrome observed in Quito.

" One of the cases presented meningitis like symptoms which did not respond to the usual treatment. More similar cases were observed later by the author.

" It is mentioned that in the region of Sto. Domingo de los Colorados he observed cases in which all the children of families had kwashiorkor."

COETZEE, J. N. & PRETORIUS, P. J. **The Incidence of Certain Strains of *E. coli*, *Shigella* and *Salmonella* in Kwashiorkor in the Pretoria Area.** *South African Med. J.* 1956, July 21, v. 30, No. 29, 688–9.

" From this limited investigation it thus appears unlikely that *E. coli* and other pathogens play an important causative role in the diarrhoea of kwashiorkor."

MUKHERJEE, K. L. & JELLIFFE, D. B. **Kwashiorkor-Type Dermatosis in a Four-Month Old Breast-Fed Bengali Infant.** *J. Trop. Pediatrics.* London. 1956, Sept., v. 2, No. 2, 93–6, 2 figs.

SPRUE

LIMBOS, P. Un cas de sprue tropicale provenant du Congo Belge. [**A Case of Tropical Sprue from the Belgian Congo**] *Ann. Soc. Belge de Méd. Trop.* 1956, Apr. 30, v. 36, No. 2, 151–8, 1 fig. on pl. [13 refs.]

This paper recounts in detail a case of sprue which originated at Matadi in the Belgian Congo and which was treated in the Leopold II Clinic in Antwerp. It is suggested that this is the first recorded instance from the Belgian Congo. This was in a single woman of 41 who had just completed her tour of 3 years from 1947–1950. When on leave in Belgium in 1951 a mild degree of anaemia became apparent. At the close of 1955 a persistent diarrhoea set in with weakness and loss of weight. The advent of tetany with the signs of Chvostek and Trousseau, together with the character of the faeces, pointed to the diagnosis of sprue. A large number of investigations on the biochemistry of the blood and faeces confirmed the diagnosis which was reinforced by radiographic appearances of the bowel. Rapid improvement was made on a fat-free, gluten-free diet and injections of calcium. The psychological aspect which was noticeable and troublesome became altered, though some puerility remained. Although much improved it was not possible to regard her as having completely recovered.

The clinical state, without involvement of the mouth or tongue, would classify this case as " incomplete sprue ". The author bases his opinion on the character of the stools, the hypoproteinaemia, hypocholesterinaemia

and the flat blood-sugar curve. Many other details are given and comments made on other suspicious cases from the Congo, hitherto unrecorded.

[This record of what is now generally known as "tropical sprue" is not entirely convincing. The therapeutic effect of a gluten-free diet would suggest the diagnosis of an atypical idiopathic steatorrhoea as being more likely.] *Philip Manson-Bahr*

Nadel, H. & Gardner, F. H. **Bacteriological Assay of Small Bowel Secretion in Tropical Sprue.** *Amer. J. Trop. Med. & Hyg.* 1956, July, v. 5, No. 4, 686–9.

"Studies of the bacterial population in the jejunum of patients with tropical sprue syndrome and volunteer control patients have been determined by intestinal intubation. No alteration of the bacterial flora was observed in sprue patients when compared to volunteer subjects without malabsorption. These observations suggest that the impaired nutritional absorption in the sprue syndrome cannot be attributed to the effect of an altered bacterial flora."

[See this *Bulletin*, 1950, v. 47, 75.]

HAEMATOLOGY

Hilke, H., Plester, D. & Weiss, C. **Haematological Investigation in the Mabaan Tribe of the South Eastern Sudan.** *J. Trop. Med. & Hyg.* 1956, Aug., v. 59, No. 8, 180–83, 5 figs. [16 refs.]

"In a survey of 100 healthy members of the Mabaan tribe normal red cell and haemoglobin values were found in spite of an inadequate diet.

"Leucopenia was found in the majority of cases with an inverted granulocyte-lymphocyte ratio."

Miettinen, M. **Studies of Serum Lipids and Lipoproteins in some Anaemias.** *Ann. Med. Intern. Fenniae.* Helsinki. 1956, v. 45, Suppl. 22, 77 pp. + 15 pp. of tables, 11 figs. [Numerous refs.]

Jandl, J. H., Greenberg, M. S., Yonemoto, R. H. & Castle, W. B. **Clinical Determination of the Sites of Red Cell Sequestration in Hemolytic Anaemias.** *J. Clin. Investigation.* 1956, Aug., v. 35, No. 8, 842–67, 14 figs. [29 refs.]

"The sites of deposition of Cr^{51} in the human body were determined by body surface counting following the injection into normal subjects of

Cr^{51}-labelled red cells, hemoglobin, and chromic chloride in saline. Differences characteristic of each were observed and served as a basis for interpretation of a study of a series of 11 patients with hemolytic anemias of diverse kinds. Measurements made on these patients following injection of Cr^{51}-labelled autologous red cells suggested that progressive accumulations of Cr^{51} in the spleen accompanying the disappearance of Cr^{51}-labelled red cells from the blood stream indicates active red cell sequestration. In determining the extent of this sequestration a simple expression may be employed (index of sequestration) which deducts that radioactivity initially present and due simply to the size of the splenic vascular bed from later values obtained over that organ. The methods described should in practice constitute a simple clinical device for determining the need for splenectomy. In certain hemolytic anemias the short survival of labelled red cells in the circulation is accompanied by a progressive increase of radioactivity over the spleen and the anemia is relieved by splenectomy."

Trincão, C., de Almeida Franco, L. T. & Gouveia, E. Anemias gravídicas em Cabo Verde (São Vicente). [**Anaemias of Pregnancy in S. Vicente, Cape Verde Islands**] *Anais Inst. Med. Trop.* Lisbon. 1956, Mar.–June, v. 13, Nos. 1/2, 27–40, 1 fig. [29 refs.] English summary.

Trincão, C., de Almeida Franco, L. T. & Gouveia, E. Anemias gravídicas nas indígenas da Guiné Portuguesa: inquérito nas tribos do interior. [**Anaemias of Pregnancy in Africans in the Interior of Portuguese Guinea**] *Anais Inst. Med. Trop.* Lisbon. 1956, Mar.–June, v. 13, Nos. 1/2, 41–9. [10 refs.] English summary (9 lines).

Stijns, J. Le traitement de l'anémie ferriprive chez l'enfant par une préparation de fer injectable par voie intramusculaire. [**The Treatment of Iron Deficiency Anaemia in Children by Intramuscular Injections of an Iron Preparation**] *Ann. Soc. Belge de Méd. Trop.* 1956, Apr. 30, v. 36, No. 2, 165–78. [21 refs.]

The author investigated the haematological responses of 20 children suffering from iron deficiency anaemia to treatment by intramuscular iron. The preparation used was Imferon (Benger), containing dextran and iron, the latter in a concentration of 50 mgm. per ml. In 16 cases the anaemia was attributable to hookworm infection, in 1 to prematurity and in 3 it was of doubtful aetiology. The ages ranged from 5 months to $4\frac{1}{2}$ years, ages at which the use of intravenous iron is fraught with difficulty. In 10 cases the anaemia was severe, below 4·75 gm. Hb per 100 ml., the remainder being below 6·7 gm. per 100 ml. The dose of iron

required was calculated according to the formula: [(12 − Hb)3·4 + 10] P mgm., where 12 = normal haemoglobin in gm. per 100 ml., Hb = initial haemoglobin in gm. per 100 ml., 3·4 mgm. per gm. is proportion of iron in haemoglobin, 10 mgm. per kgm. = arbitrary requirement for iron by tissues, and P = weight of infant in kgm.

This total dose was injected intramuscularly in 2–4 injections on consecutive days or at intervals of 3–10 days. In some children with persistent hookworms an additional 100–300 mgm. were given. The average dose was 365 mgm. The ampoules contained 100 mgm. of iron per 2 ml.

Detailed studies were made of the haematological response. The children with hookworms were treated with anthelmintics as soon as the condition was satisfactory. The author found that the treatment was free from any unpleasant side-effects and was invariably successful.

An initial reticulocytosis is followed by a fall in some cases which are severely anaemic. This being attributable to lack of readily available iron, the author recommends the giving of iron by mouth during the first few days. Examination at the end of 7–8 weeks showed haemoglobin levels ranging from 9·24 to 12·16 gm. per 100 ml.

[Although this is not a controlled experiment in iron therapy alone, the results fully demonstrate the efficacy of this preparation of iron for intramuscular use.] *Frederick J. Wright*

Seah Cheng Siang & Lo Hong Ling. **Thalassemia in Two Chinese Families.** *Proc. Alumni Ass., Malaya.* 1956, June, v. 9, No. 2, 95–106, 9 figs. [24 refs.]

[See this *Bulletin*, 1956, v. 53, 488.]

Coleman, W. A. & Furth, F. W. **Splenic Infarction in a Patient with Sickle-Cell-Hemoglobin-C Disease. Report of a Case occurring following Air Travel.** *Arch. Intern. Med.* 1956, Aug., v. 98, No. 2, 247–9. [17 refs.]

[See this *Bulletin*, 1955, v. 52, 572.]

VENOMS AND ANTIVENENES

Mutić, N. **Immunochemical and Biochemical Properties of Ammodytes Viper Venom** (*Vipera ammodytes* **L.**). *Bull. Sci., Yougoslavie.* 1956, Mar., v. 2, No. 4, 105, 2 figs.

By free electrophoresis the author distinguished at least 7 protein components of the venom of *V. ammodytes*, and the electrophoretic

patterns resembled those of *V. aspis*, but not of *Bungarus caeruleus* and *Naja naja*. Adsorption chromatography of the toxin on filter paper showed several protein fractions, differing in haemolytic activity and toxicity for white mice.

Tested by Oudin's method, the venom showed 3 antigens, and the same test for protein fractions at different salt concentrations showed that all 3 antigenic components were partially precipitable at low ionic strength. Various amino-acids were found by chromatographic analysis in the protein hydrolysate.

A great proportion of the venom proteins remained in solution after dialysis, and the haemolytic and neurotoxic activity was restricted to these water-soluble proteins. An ethanol-soluble fraction was obtained which showed neurotoxic effect 4 times as great as that of the original venom. This represented the poisonous principle of the venom in an impure state.

Charles Wilcocks

Lin, Chau-Ching. **The Relationship between the Dose of Taiwan Cobra (*Naja atra*) and Taiwan Habu (*Trimeresurus mucrosquamatus*) Venom and Time of Death in Mice.** *J. Immunology.* 1956, Aug., v. 77, No. 2, 87–93, 2 figs.

Trethewie, E. R. **The Effect of Poly-Vinyl-Pyrollidone and Tetra-Hydro-Aminoacridine on the Mortality and Survival Time of Mice injected with Snake Venom.** *Med. J. Australia.* 1956, July 7, v. 2, No. 1, 8–11, 5 figs. [13 refs.]

"The influence of tetra-hydro-aminoacridine and poly-vinyl-pyrollidone on the survival time and mortality in mice following the injection of cobra venom (*Naja Naja*) has been investigated.

"The survival time is significantly prolonged under these circumstances. When the two drugs are given concurrently to mice there is an additive non-synergistic effect on the survival time.

"The survival rate of all animals injected with PVP, THA and a combination of the two is increased statistically with high significance when compared with controls.

"The possible mechanism of these activities is outlined."

Lissitzky, S., Miranda, F., Etzensperger, Paulette & Mercier, J. Sur la toxicité du venin de deux espèces de Scorpions nord-africains. [**The Toxicity of the Venoms of Two Species of Scorpions from North Africa**] *C.R. Soc. Biol.* 1956, v. 150, No. 4. 741–3.

Tange, Y. Beitrag zur Kenntnis der Morphologie des Giftapparates bei den japanischen Fischen. XV. Über den Giftapparat bei *Plotosus anguillaris* (Lacépède). [**Morphology of the Poison Apparatus of Japanese Fish. XV. Poison Apparatus of** *Plotosus anguillaris*] *Yokohama Med. Bull.* 1955, Dec., v. 6, No. 6, 424–37, 7 figs. [24 refs.]

TOXOPLASMOSIS

Zoltai, N. & Csaba, K. A toxoplazmózis hazai előfordulása. [**Toxoplasmosis in Hungary**] *Népegészségügy.* Budapest. 1953, Dec., v. 34, No. 12, 331–4. [13 refs.] German summary 337.

The dye test gave positive results in 10 of 31 patients with oligophrenia, hydrocephalus and chorioretinitis who were suspected on clinical grounds of suffering from toxoplasmosis. One patient was a man aged 21 with mental retardation and chorioretinitis; serological investigation of 6 members of his family showed that 5 were also infected, and a field investigation of their home locality was then carried out among all persons and their families suspected of suffering from the disease. Of a total of 200 persons investigated 39 (19·5 per cent.) gave titres of 4 to 256 in the dye test, and 23 of 177 gave positive results in the Frenkel test. Of 22 positive reactors examined clinically 2 had eye conditions, 9 oligophrenia and 12 showed cerebral calcifications. Several instances of familial disease were observed, but the mother was usually not infected and the disease was therefore not congenital. Titres of 256 were found only exceptionally in children below 10 years of age, but were commonly encountered in the 18–23 age-group. The main incidence of infection was observed in the 21–30-year age-group, in which 13 of a total of 39 persons were found to be infected. *D. J. Bauer*

Swan, C. & French, E. **A Case of Toxoplasmosis.** *Med. J. Australia.* 1956, June 16, v. 1, No. 24, 1009–11, 2 figs. on pl. [15 refs.]

"A female child, aged four months, suffered from unilateral chorioretinitis, cerebral calcification and, at birth, transient jaundice. Her mother, who had lived for the first six months of the pregnancy in the Northern Territory and thereafter in South Australia, had been well during gestation except for nausea and vomiting in the early months. The child's serum taken thirteen months after she was born gave a positive response to the complement fixation test against toxoplasma in a titre of one in 128, whereas the mother's serum gave a positive response in a titre of one in eight. The result of the cytoplasm-modifying dye test

was positive in both the child's and the mother's serum at a dilution of one in 1024.

"On the basis of the foregoing evidence, a diagnosis of congenital toxoplasmosis is considered justifiable."

CHANDLER, Anne H. & WEINMAN, D. **Prolonged Storage of *Toxoplasma* at −70 C. A Preliminary Report.** *Amer. J. Clin. Path.* 1956, Mar., v. 26, No. 3, 323–6.

In an attempt to alleviate some of the tedium of continual mouse passage in the maintenance of *Toxoplasma* strains the authors have extended previous investigators' work in attempts to preserve the parasites for long periods by freezing.

With the RH strain and one of porcine origin it was found that, after freezing in an alcohol and dry-ice bath at −15°C., the toxoplasms could be successfully stored in 15 per cent. glycerol for as long as 184 days at −70°C. The material used was heavily infected mouse peritoneal fluid.

The death rate among the parasites was found to be sometimes as high as 99·0 per cent. and, with a starting number of $1{\cdot}5 \times 10^7$ organisms, the infection of mice was sometimes impossible after the storage period. With numbers between $1{\cdot}7 \times 10^7$ and $4{\cdot}4 \times 10^7$, however, infections were obtained.

In conclusion the authors state that, given an adequate number of toxoplasms, as least one infective dose [considered here to be approximately 100 parasites] will remain viable for a minimum of 6 months and this dose will kill mice in 8–10 days. Satisfactory results were obtained when the starting number of toxoplasms was approximately 2×10^7 or more.

[Regular users of the Sabin-Feldman dye test will doubtless find this information of considerable value. The chief objection raised by the authors against maintaining *Toxoplasma* in chronically infected laboratory rats is that "re-adaptation" of the parasites may be necessary when they are re-introduced into mice. In the abstracter's experience such re-adaptation to high virulence in mice by the RH strain is rarely necessary even after as long as 18 months in the rat brain. The RH strain is that generally accepted as the standard material for the dye test, and for prolonged "storage", at least, maintenance in chronically infected rats still constitutes the most reliable method.] *R. Lainson*

THIERMANN, Erica & NÁQUIRA, F. Contribucion al diagnóstico parasitológico de la toxoplasmosis. Demostración del *Toxoplasma gondii* en 5 casos. [**Contribution to the Parasitological Diagnosis of Toxoplasmosis. Demonstration of *Toxoplasma gondii* in Five Cases**] *Bol. Chileno de Parasit.* 1956, Jan.–Mar., v. 11, No. 1, 13–16. English summary.

Jacobs, L., Naquin, H., Hoover, R. & Woods, A. C. **A Comparison of the Toxoplasmin Skin Tests, the Sabin-Feldman Dye Tests, and the Complement Fixation Tests for Toxoplasmosis in Various Forms of Uveitis.** *Bull. Johns Hopkins Hosp.* 1956, July, v. 99, No. 1, 1–15. [13 refs.]

Of 193 adult patients with uveitis investigated, 86 had the non-granulomatous and 107 the granulomatous form. In the granulomatous cases 37 (35 per cent.) were attributed to toxoplasmosis, taking a dye test titre of at least 1 in 64 as positive. At this titre, which from the evidence presented may reasonably be expected in a patient with active ocular toxoplasmosis, there was an 80 per cent. correlation between the dye and toxoplasmin tests. The complement-fixation test was of little help in the diagnosis unless it developed during the course of an acute infection. Of 22 patients who received treatment with Daraprim [pyrimethamine] and sulphadiazine, 13 showed a clear therapeutic response, there were severe toxic effects in 4 and milder reactions in 4 others. *I. A. B. Cathie*

Jacobs, L., Cook, M. Katherine & Wilder, Helenor C. **Serologic Data on Adults with histologically diagnosed Toxoplasmic Chorioretinitis.** Reprinted from *Trans. Amer. Acad. Ophthalm. & Otolaryngol.* 1954, Mar.–Apr., 193–8. [16 refs.] Discussion 198–200.

Chorioretinopathy, it is stated, is a predominant finding in congenital toxoplasmosis but there is doubt whether it occurs in the acquired infection. Clinical experience, however, suggests that there is an association between positive serological reactions for toxoplasmosis and the incidence of granulomatous uveitis when cases of uveitis of probable non-toxoplasmal origin are excluded.

Evidence is quoted of protozoa, presumably *Toxoplasma*, having been found in chorioretinal lesions originally considered to be of tuberculous origin. Serum was obtained from 21 patients in whose retina these protozoa had been demonstrated, and with each specimen a complement-fixation and a Sabin-Feldman dye test was carried out. The complement-fixation test was positive in only 3 cases but the dye test was positive in all. The dye test is positive in approximately 50 per cent. of the general population, but the chance of its being positive in 100 per cent. of 21 specimens from the general population is only 1 in 2,000,000. In all but 3 of these 21 sera, however, the test was positive only at a low titre, *i.e.*, one at which the test is commonly positive in normal persons. It was considered unlikely that sufficient time had elapsed between enucleation of the eye—and demonstration of the parasites—and taking the serum, for the titre to have fallen to such low levels. Three possibilities are therefore raised: (i) that the parasites present in the eyes of these 21 patients with uveitis were not *Toxoplasma* but others provoking

the production of antibodies which cross-react serologically with *Toxoplasma*, (ii) that the parasites were *Toxoplasma* but represented a residue from a congenital infection, and (iii) that the uveal tract infection was acquired and the persistence of the parasites in the eye after they had disappeared from extra-neural tissues resulted in little antigenic stimulation, so that antibodies as measured by the dye test were low in titre.

The first possibility was considered unlikely as there is little evidence that other organisms cross-react with *Toxoplasma* in the dye test. With regard to the second possibility it was considered that the infections might have been of long standing, but it is at present unknown how long the parasite may lie dormant in man. In connexion with the third possibility it is stated that the distinction between congenital and acquired toxoplasmosis may be a matter of degree rather than of kind; it is also conjectured that the antibody response to latent parasites could vary and depend on their localization.

It is concluded that the demonstration of the toxoplasmic aetiology of uveitis will come by the isolation and identification of parasites from typical cases, but in the meantime the statistical analysis of the results of the dye test in this series suggested that toxoplasmosis had been the cause of the uveitis. It is further suggested that the small number of positive complement-fixation reactions indicate that this test is of no value in the diagnosis of old infections. [The assumption that the infections here being considered were old is hardly justifiable in view of the indecisive nature of the evidence. The authors may well be correct to support the commonly held view that much unexplained uveitis is caused by toxoplasmal infection, but their argument loses force by much conjecture. It is also noteworthy that Awad and Lainson (this *Bulletin*, 1955, v. 52, 84) and Awad (*ibid.*, 294, 480) have cast doubt on the specificity of the dye test in toxoplasmosis.] *A. W. Woodruff*

Matthes, A. & Piesbergen, H. Konnatale Toxoplasmose und Vakzine-Enzephalitis. Zugleich ein Beitrag zur Frage der pathologischen Veränderungen bei Müttern toxoplasmosekranker Kinder. [**Congenital Toxoplasmosis and Post-Vaccination Encephalitis (With a Contribution to the Problem of Pathological Lesions in Mothers of Children with Toxoplasmosis)**] *Deut. med. Woch.* 1956, July 13, v. 81, No. 28, 1121–4, 5 figs. (4 on pl.).

Two cases are described in this paper. Ten days after vaccination against smallpox an 11-month-old infant developed typical encephalitis, and during investigation of the condition choroidoretinitis and intracerebral calcification were found. The dye test for toxoplasmosis was positive at 1 in 16,000 and the complement-fixation test was strongly positive. The mother of this child was found to have choroidoretinitis and a positive complement-fixation test, the dye test titre being 1 in 4,000. This mother had had a 3 months abortion a year and a half before the birth of the

affected child. In a second child, vaccinated at the age of 2½ years, encephalitis developed 9 days later. Intracerebral calcification was found radiologically and there were no eye changes. The dye test for toxoplasmosis was positive at 1 in 2,000 with a positive complement-fixation test. The mother of this patient was known to have had epileptiform attacks when 9 years of age, at which time unexplained intracerebral calcification was demonstrated. She had no eye changes; the dye test was positive at 1 in 64 at the time her child was investigated.

The possible relations between post-vaccinal encephalitis and latent congenital toxoplasmosis are discussed. *I. A. B. Cathie*

Smith, C. H. **Experimentally induced Ocular Toxoplasmosis in Rabbits.** *Brit. J. Exper. Path.* 1956, June, v. 37, No. 3, 248–52, 4 figs. on pl. [15 refs.]

Winter, W. D., Jr. & Foley, G. E. **Chemical and Biologic Studies on 1,2-Dihydro-*s*-Triazines. XII. Treatment of Experimental Murine Toxoplasmosis, with a Note on Mutation.** *Antibiotics & Chemotherapy.* New York. 1956, July, v. 6, No. 7, 444–9, 4 figs. [20 refs.]

Dihydrotriazines have a close structural resemblance to pyrimethamine, and might therefore have therapeutic activity in toxoplasmosis. Therapeutic tests were done with 31 such compounds in mice inoculated with a recently isolated strain of *T. gondii*, the inoculum being such as to produce 100 per cent. mortality in 10 ± 2 days. Three had a weak therapeutic activity, and 2 were highly effective: these were 4,6-diamino-1-(3′,4′-dichlorophenyl)-2-ethyl-1,2-dihydro-*s*-triazine and 4.6-diamino-1-(*m*-chlorophenyl)-2-(*n*-hexyl)-1,2-dihydro-*s*-triazine. They were ineffective orally, and had to be given subcutaneously (on the day of inoculation and 4 successive days) in about the maximum tolerated dose to produce nearly 100 per cent. survival: the infection was then eliminated. Diminished doses of the two compounds together, and of either together with sulphadiazine, had a synergic effect.

Sudden loss of activity of these drugs after 15 months of experimentation was found to be due to spontaneous mutation in the strain of toxoplasma used: the mutant was also resistant to sulphadiazine. Mutation occurred somewhere between the 118th and 128th stock mouse passage with no exposure to either drug. The possibility of such an occurrence suggests that recently isolated strains are preferable to old laboratory strains for such studies. *L. P. Garrod*

DERMATOLOGY AND FUNGUS DISEASES

Hickey, B. B. **Cranial Maduramycosis.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1956, July, v. 50, No. 4, 393–6, 4 figs. on 2 pls.

The author describes 3 cases of mycetoma of an unusual form involving the bones of the skull; all were of the " yellow " variety [possibly caused by *Nocardia somaliensis*].

Two of the patients were shepherds aged, respectively, 20 and 24 years, and the third was a farmer aged 30. In 2 of the cases the disease was of 8 years' and in the other of 4 years' duration, and a history of probably significant trauma was obtained in 2.

The entire scalp with the underlying calvarium was involved in one patient, and the radiological examination showed extensive formation of new periosteal bone with concomitant bone destruction all over the calvarium but not extending to the base of the skull. In the other two patients the disease was situated in the right orbit, causing displacement of the eye with diminution of vision, but remarkably few other signs; in one of these patients there was an extension on the right frontal region. The radiological examinations of these 2 patients showed a diffuse mass of new bone formation in the floor of the anterior fossa of the skull, extending backward to the pituitary fossa and downward through the roof of the orbit. In one patient there was an extension upwards on the calvarium, and on this part of the frontal bone the osseous changes were of the first type described above—new periosteal bone and bone destruction. The affected soft parts presented the characteristic histopathology of mycetoma. The difference between the osseous lesions on the calvarium and those on the base was striking. The reaction on the calvarium was much like that seen in a long bone affected by mycetoma, but the formation of dense bone in the basal lesions was a new observation.

Except for the local damage, the disease had little effect on the patients' general health, but the prognosis for cure was very bad. Palliative surgical treatment gave relief in one of the cases. *J. T. Duncan*

Christian, J. R., Sarre, S. G., Peers, J. H., Salazar, E. & de Rosario, J. **Pulmonary Coccidioidomycosis in a Twenty-One-Day-Old Infant.** *J. Dis. Children.* Chicago. 1956, July, v. 92, No. 1, 66–74, 4 figs. [43 refs.]

The authors present a very useful analytical review of 99 published cases of coccidioidomycosis (*Coccidioides immitis*) in infants and children, from the time of birth to 16 years of age. To this they add a new fatal case of the pulmonary form of the disease in a 3-week-old infant. This infant, of Mexican parentage but born in Chicago, developed an acute disease marked by progressive dyspnoea and cyanosis with coughing. A radiological examination of the chest showed patchy consolidation

affecting the entire lung fields on both sides, and, on the basis of the clinical features, a diagnosis of bronchopneumonia with possible congenital heart disease was made. An oxygen tent was used but, on the fifth day, despite an increase to 55 per cent. of oxygen in the atmosphere of the tent, cyanosis became continuous. On the seventh day digitoxin was administered but the child's condition deteriorated rapidly and he died on the eighth day in hospital and ninth day of illness.

At autopsy, both lungs showed extensive nodular, granulomatous consolidation and it was estimated that almost two-thirds of the lung parenchyma was replaced by this solid tissue. Individual nodules ranged in size from 1 to 10 mm. and larger forms resulted from confluence. Many of the larger forms showed necrotic change at the centre and some had begun to break down. Histologically, they presented the characteristic picture of the coccidioidal granuloma with numerous spherules of *C. immitis* present. The disease appeared to be almost restricted to the lungs and the peribronchial lymph nodes, suggesting an initial pulmonary infection.

As the child was born in Chicago and had never been in an area of endemic coccidioidomycosis, the source of infection presented a problem. However, a significant fact was that the mother had suffered from a local coccidioidal lesion of the foot, which had been excised in Mexico a year before the birth of the child, and had healed completely. The possibility of congenital infection of the child is rejected and, although the mother is regarded as the probable source of the infection, the actual mode of transmission remains unknown. *J. T. Duncan*

Spaur, C. L. **Atypical Cultures of** *Coccidioides immitis*. *Amer. J. Clin. Path.* 1956, June, v. 26, No. 6, 689–90.

Done GPR

Friedman, Lorraine & Pappagianis, D. **The Inhibitory Effect of Peptone on the Sporulation of Three Strains of** *Coccidioides immitis*. *Amer. Rev. Tuberculosis*. 1956, July, v. 74, No. 1, 147–8, 2 figs.

The authors, in California, noted that some strains of *Coccidioides immitis* sporulated poorly, although they grew well, in media containing peptone. Accordingly they tested 4 strains (one known to form spores prolifically) on a medium containing 2 per cent. glucose, 1 per cent. yeast extract and 2 per cent. agar, with and without 1 per cent. Bacto-peptone. To 20 ml. of melted medium 1 ml. of saline suspension of the culture was added. Incubation was at 34°C.

Various degrees of inhibition of spore formation occurred in 3 of the 4 strains in the presence of peptone. After a week the mycelial mats of of the strain showing marked inhibition were of the same size in both media. After 2 weeks, the aerial hyphae of the culture on the medium with peptone were collapsed, leaving areas of air trapped on the surface:

microscopically, spores were found but they were few. In the medium without peptone, cultures of the same strain showed the cracked surface indicating large numbers of closely packed spores, and this was confirmed microscopically. The naked-eye appearances are shown in 2 photographs.

The mechanism of this inhibition has not been determined, nor has this effect been shown to occur with all peptones or with all lots of a single peptone. The practical importance of this finding is stressed, especially since not all strains of *C. immitis* form spores in large numbers.

H. J. O'D. Burke-Gaffney

Pappagianis, D., Smith, C. E. & Kobayashi, G. S. **Relationship of the *in vivo* Form of *Coccidioides immitis* to Virulence.** *J. Infect. Dis.* 1956, May–June, v. 98, No. 3, 312–19, 5 figs. [16 refs.]

Reference is made to a suggestion that virulence, in the sense of power to invade and infect, may, in the case of some dimorphic pathogenic fungi, be related to their adaptability, morphological and physiological, to parasitic life in the animal tissues.

The present authors, who interpret virulence as pathogenicity and the power to cause progressive disease, have conducted comparative tests of the virulence of the parasitic endospores of *Coccidioides immitis* from experimentally infected animals, and the saprophytic arthrospores from cultures of the fungus. Two strains of *C. immitis* were used; one of high virulence and the other of very low virulence for mice. Each of the spore forms from each of the 2 strains was tested for virulence, as judged by the death rate within a stated period and the extent of the lesions caused in male white mice inoculated intraperitoneally with measured doses of viable spores. The results of these tests showed a striking difference in virulence between the two strains, whether the tests were made with the arthrospores or with the parasitic endospores. In fact, there was no difference in virulence between arthrospores and endospores of the same strain.

In culture, the endospores of both strains germinated in 4–5 hours at 34°C. and the arthrospores only after 13 to 15 hours' incubation. The rapid germination of endospores on the bronchial mucosa, with consequent resistance to phagocytosis, may explain why bronchogenic dissemination of coccidioidomycosis from chronic pulmonary cavities is unusual, in contrast to the dissemination of tuberculosis. *J. T. Duncan*

Friedman, Lorraine & Smith, C. E. **Vaccination of Mice against *Coccidioides immitis*.** *Amer. Rev. Tuberculosis.* 1956, Aug., v. 74, No. 2, Pt. 1, 245–8, 1 fig.

Although transient infection of man by *Coccidioides immitis* confers a relatively solid immunity, attempts to provoke a state of active immunity in guineapigs by vaccination with killed cultures of the fungus have, in

general, been unsuccessful [see NEGRONI *et al.*, this *Bulletin*, 1951, v. 48, 1039; VOGEL *et al.*, *ibid.*, 1955, v. 52, 87]. The present authors, who attribute the previous lack of success to the unsuitability of the guineapig for this work, have conducted protection experiments on the mouse.

Three vaccines were prepared: one consisting of the ground-up, acetone-killed, submerged culture of the Cash strain of *C. immitis*, adjusted to a concentration of 19 per cent. by volume in isotonic saline, and the other two of the formol-killed arthrospores of strain Silveira adjusted to suspensions of 21 and 27 per cent. respectively. The vaccine injections were made subcutaneously in doses of 0·1 ml. at 9, 13, 15, 17 and 22 weeks before the challenging intraperitoneal injection of 100 living spores of the Silveira strain. One hundred unvaccinated control mice were similarly inoculated, and also a group which had been "vaccinated" with wood flour, *Saccharomyces* and other materials. The animals were kept under observation for 60 days and then all survivors were killed and examined.

Over the whole period of 60 days, only 3 deaths occurred in the 3 groups of vaccinated mice, but 50 per cent. of the unvaccinated control animals died in 19 days and 80 per cent. in the 60 days. However, examination of the surviving vaccinated mice, which were killed at the end of the experiment, showed that all but a few were infected. The authors therefore advise caution in drawing conclusions from these results which might be affected by increasing the challenging dose or prolonging the period of observation. Nevertheless, the data obtained offer a strong incentive to further experiment to develop an effective vaccine. *J. T. Duncan*

TROPICAL OPHTHALMOLOGY

VANNESTE, L. Observations ophtalmologiques faites chez les consultants congolais dans la Province Orientale. [**Ophthalmological Findings among Africans in the Eastern Province, Belgian Congo**] *Ann. Soc. Belge de Méd. Trop.* 1956, June 30, v. 36, No. 3, 271–97.

GAN, K. H., SIE BOEN LIAN, WARSA, R., HEATH, A. A. & SUJONO JUDODIBROTO, R. **Isolation of a Virus (Sawah Virus) from Keratitis punctata tropica (Sawah-Keratitis, Westhoff).** *Documenta Med. Geograph. et Trop.* Amsterdam. 1956, June, v. 8, No. 2, 117–31, 11 figs.

A virus has been isolated from 15 of 22 persons suffering from *keratitis punctata tropica* (Sawah keratitis). Scrapings from corneal infiltrations were inoculated on to the dropped chorio-allantoic membranes of duck eggs at the 10th–12th day of incubation, and passages from the membrane were made after an interval of 1 to 7 days. Slight thickening of the

membrane was observed in the first 2 passages, but in later passages lesions appeared in a proportion of the eggs inoculated and the condition could be maintained through 77 passages. The lesions were smooth, rounded and very solid in consistency; they consisted of areas of ectodermal hyperplasia, with invasion of the mesoderm by cell nests in a manner resembling epidermoid carcinoma. The virus was not pathogenic for cynomolgus monkeys, goats, rice birds, rats or mice after intracerebral or intramuscular injection, or after corneal scarification, but it produced small opacities when inoculated on to rabbit cornea. Serum from a patient with Sawah keratitis fixed complement with an antigen prepared from infected chorio-allantoic membranes, and an 8-fold rise of titre was observed during the course of illness. Virus passaged in eggs agglutinated chick red cells, and inhibition of haemagglutination could be demonstrated with the sera of 3 patients. *D. J. Bauer*

MISCELLANEOUS DISEASES

Lanzo, A. Sulla splenomegalia tropicale essenziale in Eritrea. [**Essential Tropical Splenomegaly in Eritrea**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1956, July, v. 37, No. 7, 379–86. English summary (5 lines).

Out of 2,289 patients admitted to the medical department of the Iteghè Menen hospital in Eritrea from November 1954 to November 1955, 15 were found to be suffering from enlargement of the spleen, the cause of which could not be detected in spite of all possible investigations (including splenectomy in 6 cases). The author regards these 15 as belonging to the group of "essential tropical splenomegaly" and thinks that possibly chronic malaria allied to other unknown factors might be the cause. [See also Fawdry, this *Bulletin*, 1956, v. 53, 94.] *W. K. Dunscombe*

Blanch, Mona. **Eosinophilia with Hepatomegaly.** *Med. J. Australia.* 1956, Aug. 4, v. 2, No. 5, 184–5.

Bras, G. & Berry, D. M. **A Case of Veno-Occlusive Disease of the Liver in a Cow. Case Report.** *West Indian Med. J.* 1956, Mar., v. 5. No. 1, 37–8, 2 figs. on pl.

"The case of a cow suffering from veno-occlusive disease of the liver is reported. The condition has hitherto not been observed in animals in this island.

"The resemblance of the morbid anatomical findings in this cow and in our human patients is most striking.

"We feel that this observation greatly supports the hypothesis of an aetiological agent of vegetable origin. Field studies are being conducted to shed further light on the incidence and possible aetiology of this disease in animals." [See this *Bulletin*, 1956, v. 53, 1054.]

La'Brooy, E. B. **Endocardial Fibroelastosis. (A Pathological Study of 17 Cases.)** *Proc. Alumni Ass., Malaya.* 1956, June, v. 9, No. 2, 77–90, 10 figs. [21 refs.]

Telkkä, A. & Kuusisto, A. N. **Observations on Experimental Lathyrism in the Rat.** *Ann. Med. Exper. et Biol. Fenniae.* Helsinki. 1956, v. 34, No. 1, 48–56, 1 fig. [25 refs.]

"The effect of diet containing 50 per cent *Lathyrus odoratus* seeds on the organs of rat was investigated. Typical skeletal changes occurred. These alterations were more pronounced in growing rats than in adult rats. Necrotic areas in the liver were found. Adrenal cortex hypertrophied, in males more clearly than in females. The thymus showed a marked involution. Both control diet containing 50 per cent edible pea and sweet pea diet induced a hyperplasia of the thyroid."

Nigg, Clara, Ruch, J., Scott, Eva & Noble, Kathryn. **Enhancement of Virulence of** *Mallcomyces pseudomallei*. *J. Bacteriology.* 1956, May, v. 71, No. 5, 530–41, 23 figs. [19 refs.]

White mice are relatively resistant to infection with *Pfeifferella whitmori*, and the object of this work was to enhance the virulence of the organism for these animals since they are the cheapest and most uniform small species for therapeutic and immunological research. Large numbers of colonial variants were isolated from the available stock strain and the most stable of these were passaged through mice, at first intracerebrally, then intraperitoneally. Brain, spleen or liver tissue were used as inocula, with a minimum number of intervening cultures. Virulence was rapidly and greatly enhanced, to a point at which 10–100 organisms regularly killed mice by the intraperitoneal or intracerebral routes, or by inhalation. The original high virulence for golden hamsters remained unaltered.

There was no regular association between virulence and colonial form. A rough yellow type was suddenly replaced by a small intermediate variant in the course of passage, but a smooth white type retained its original appearance after enhancement.

At a later stage two fresh strains partly mucoid in type were obtained from human cases in Malaya. These were already virulent for mice by all routes in much smaller numbers than the stock strain, and were readily enhanced still further by mouse passage. *J. C. Cruickshank*

PARASITOLOGY : GENERAL

Hoeppli, R. **The Knowledge of Parasites and Parasitic Infections from Ancient Times to the 17th Century.** *Exper. Parasit.* New York. 1956, July, v. 5, No. 4, 398–419. [Numerous refs.]

Vojtěchovská, M., Vojtěchovský, M. & Petrů, M. Některé parasitologické problémy u duševně nemocných. [**Some Problems of Parasitology in Mental Patients**] *Časopis Lékařů Českých.* Prague. 1956, May 25, v. 95, No. 21, 559–66. [25 refs.] English summary.

The authors report the results of a series of parasitological investigations carried out on patients in a mental hospital in Prague. A positive toxoplasmin skin reaction was obtained in 68 (59 per cent.) of 116 female patients, in comparison with an average incidence of 10–15 per cent. in the general population. A positive histoplasmin skin reaction was obtained in 6 (13·5 per cent.) of 52 male patients. In an examination of vaginal smears in 116 patients bacterial infection was found in 58, *Trichomonas* in 29 and fungi in 8 instances. In examinations of stools carried out on 205 male patients *Giardia intestinalis* was found in 15, *Entamoeba coli* in 16, *Iodamoeba bütschlii* in 5, *Trichuris trichiura* in 5 and *Enterobius vermicularis* in 3 instances, and *Ascaris lumbricoides* was found once. In a group of 118 female patients *Entamoeba coli* was found in 11, *Trichomonas intestinalis* and *Trichuris trichiura* in 1, and *Enterobius vermicularis* in 6 instances; 28 patients showed evidence of enterobiasis. A titre of 100 against *Leptospira canicola* by the agglutination-lysis method was found in 3 of 100 female patients. *D. J. Bauer*

Payne, E. H., Gonzales-Mugaburu, L. & Schleicher, E. M. **An Intestinal Parasite Survey in the High Cordilleras of Peru. I.** *Amer. J. Trop. Med. & Hyg.* 1956, July, v. 5, No. 4, 696–8.

"Variation in altitude seemed to have little influence upon the percentages of parasites. The small number of persons studied in Recuay may account for the observed variations in this instance. Dwarf tapeworm was especially frequent and the first hundred persons examined all carried *Giardia lamblia*, which gave the investigators the impression (later proved false) of having found a population with 100 per cent. incidence of this infection. *Heterodera* seemed to increase with lower altitudes, perhaps due to the increased consumption of vegetables of the collard family. A high incidence of *Ascaris* was noted among the Quechua Indians as well as of *Balantidium* which was also frequent in the jail inmates. Hookworm was present in the outlanders in the jail and in the police force. *Taenia* was not as common as expected and only one case of *Bodo* and one of *Enteromonas* were found, both among the Vicos

people, and one case of *Haemonchus* at Carhuas. Four cases of *Isospora* and five of unidentified species of intestinal nematodes were found irregularly distributed throughout the valley. No correlation between the parasite population of an individual and his eosinophile count was discovered."

Dauzier, G., Willis, T. & Barnett, R. N. *Pneumocystis carinii* **Pneumonia in an Infant.** *Amer. J. Clin. Path.* 1956, July, v. 26, No. 7, 787–93, 5 figs. [13 refs.]

"A 21-month-old white boy, born and reared in Connecticut, died from pneumonia caused by *Pneumocystis carinii*. The diagnosis was made postmortem by identifying the causal agent in sections of lung impregnated with silver. Although numerous instances of this illness have been recognized in other countries, no previous case is reported to have originated in the United States. Recognition of this infection is based chiefly on histopathological findings, but clinical diagnosis should be feasible when the entity is better known. If the disease is suspected, properly performed studies of sputum may result in identification of the causal agent antemortem."

Pizzi, T. Comprobación de *Pneumocystis carinii* en casos de neumonía intersticial plasmocitaria. Comunicación preliminar. [**Finding of *Pneumocystis carinii* in Cases of Plasmocytic Interstitial Pneumonitis**] *Bol. Chileno de Parasit.* 1956, Jan.–Mar., v. 11, No. 1, 16–17, 1 fig.

The English summary appended to the paper is as follows:—

"*Pneumocystis carinii* was found in the alveolar exudate of the lungs in seven cases of interstitial pneumonitis of premature infants. The diagnosis was made post mortem by the finding of typical stages of the parasite in sections and lung smears."

ENTOMOLOGY AND INSECTICIDES: GENERAL ZOOLOGY

[Papers on the toxic effects of insecticides in man are abstracted in the *Bulletin of Hygiene* under the general heading of Occupational Hygiene and Toxicology.]

Williams, R. W. **Observations on the Bionomics of some *Culicoides* of Cheboygan County, Michigan (Diptera, Heleidae).** Reprinted from *Bull. Brooklyn Entom. Soc.* 1955, Dec., v. 50, No. 5, 113–20.

Williams, R. W. **Studies on the *Culicoides* of Baker County, Georgia (Diptera, Heleidae). I. Preliminary Survey and Observations.** Reprinted from *Ann. Entom. Soc. of America.* 1955, Jan.–Mar., v. 48, Nos. 1/2, 30–34.

Williams, R. W. **The Biting Midges of the Genus *Culicoides* found in the Bermuda Islands (Diptera, Heleidae). I. A Description of *C. bermudensis* n.sp. with a Key to the Local Fauna.** *J. Parasitology.* 1956, June, v. 42, No. 3, 297–300, 3 figs. **II. A Study of their Breeding Habitats and Geographical Distribution.** *Ibid.*, 300–305, 1 fig.

Svoboda, K. & Vobecký, J. Naše zkušenosti s použitím insekticidů proti komářím kalamitám. [**Our Experience with the Use of Insecticides against Mosquito Plagues**] *Československ. Epidemiol., Mikrobiol., Imunol.* Prague. 1956, v. 5, No. 2, 94–100, 2 figs. [25 refs.] English summary (6 lines).

The authors give an account of mosquito eradication measures carried out in 2 localities in Czechoslovakia of 2,400 and 6,000 hectares respectively which were situated along rivers subject to periodic flooding. During the winter buildings were sprayed twice with DDT emulsion applied at the rate of 1 gm. per square metre. At the beginning of May ponds and flooded areas were sprayed with DDT in an organic solvent; spraying was carried out mechanically as far as possible, and was supplemented by hand spraying in areas unsuitable for the use of machines. The solution was diluted 1:40 to 1:250 with water before use, and applied at the rate of 500 to 4,000 gm. DDT per 250 square metres. The areas treated in the two localities amounted to 105 and 450 hectares respectively. Death of larvae occurred after periods ranging from 4 to 12 hours; few adults emerged, and it was possible to engage in wood-cutting and other outdoor activities which had been rendered impossible in previous years by plagues of mosquitoes. *D. J. Bauer*

Brown, A. W. A. & Perry, A. S. **Dehydrochlorination of DDT by Resistant Houseflies and Mosquitoes.** [Correspondence.] *Nature.* 1956, Aug. 18, v. 178, 368–9.

DDT-resistance is now developing in mosquitoes. Resistant salt-marsh *Aëdes* of Florida and resistant *Aëdes aegypti* from Trinidad compared with normally susceptible strains of the same species proved to be, respectively, 13 and 500 times more resistant than the normal strains. Following the lines of work done on resistant house-flies, the authors show that large amounts of DDT were taken up by these strains of resistant mosquito and considerable amounts of it converted into DDE. The

DDT-dehydrochlorinase of mosquitoes seems, however, to require for laboratory assay of its activity different chemical conditions from those which are satisfactory for measuring the activity of DDT-hydrochlorinase of resistant house-flies. *D. S. Bertram*

Greenberg, B. **A Method for the Sterile Culture of Housefly Larvae, *Musca domestica* L.** *Canadian Entomologist.* 1954, Nov., v. 86, No. 11, 527–8.

A breeding medium known as CSMA and consisting of 33·3 per cent. wheat bran, 26·7 per cent. alfalfa meal and 40 per cent. brewers' grain was used in these experiments. About 50 sterilized eggs of *Musca domestica* were added to flasks containing 60 cc. CSMA and 50 cc. tap water after this mixture had been incubated at 36°C. for 24 or 48 hours and then autoclaved for 2 hours at 118°C. In another experiment the mixture was autoclaved at once and not incubated. In the absence of any incubation the larvae grew only very slightly after hatching and died as first stage larvae in 3 to 7 days. When 24 hours' incubation preceded autoclaving, larval growth was slow, the minimal period from egg to adult was 12 days, and the pupae were undersized. When incubation lasted for 48 hours, fly development was as rapid and successful as in control series. It is presumed that food substances of some kind were formed in the 48-hour incubation period and persisted, despite autoclaving, in sufficiency to ensure normal fly development. *D. S. Bertram*

Amaro, J. **Miasis.** *Med. Colonial.* Madrid. 1956, July 1, v. 28, No. 1, 11–23.

Grzywiński, L. Masowa inwazja *Bdellonyssus bacoti* Hirst u ludzi. [**Mass Infestation of *Bdellonyssus bacoti* on Man**] *Wiadomości Parazytologiczne.* Warsaw. 1956, v. 2, No. 4, 231–3.

The English summary appended to the paper is as follows:—

"The author describes the course of *Bdellonyssus bacoti* infestation on man which repeatedly took place in the Wrocław city. Basing on his observations he came to following conclusions:

"1. *B. bacoti* infestations on man take place more frequently than they are registered by research centres;

"2. with great rat invasions of premises, the transference of these ticks [*sic*] to man is to be taken into consideration;

"3. the efficacy of the deratization methods hitherto applied is problematic—there are to be analyzed these methods with special control of their technical part."

MISCELLANEOUS PAPERS

Hennessey, R. S. F. **Some Social Effects of Tropical Medicine within the Commonwealth.** *J. Roy. Soc. Arts.* 1956, Mar. 16, v. 104, No. 4973, 332–42. Discussion 342–3.

In this address to the Royal Society of Arts the author took a broad view of the effects brought about by the introduction of modern western medicine into the African communities of Uganda. An early campaign was occasioned by the prevalence of syphilis, and the knowledge of the value of treatment with arsenical preparations, and the dramatic effects achieved in that campaign, did much to persuade the Africans of the value of European influence. Similar results have followed the use of sulphonamides, penicillin and other powerful drugs, and the measures taken to control trypanosomiasis, malaria and leprosy, and the dramatic success of efforts to control *Simulium*, have appealed strongly to the people. The standards of environmental hygiene have been raised by deliberate instruction and example, and at the present time large numbers of Africans are taking an intelligent part in the health services of the country, basing their work on conceptions of disease totally foreign to the beliefs and traditions of their forbears. This is a most remarkable and rapid change, and it has been associated with changes in the mode of life resulting from the increasingly intense development of physical resources in the country. Such changes must lead to a break-up of old loyalties, to doubt as to the future, and to political unrest, as well as to new patterns of disease, and the author warned his audience that increasing stress of industrial life is likely to have serious psychological repercussions.

Charles Wilcocks

Brink, A. J. **The Normal Electrocardiogram in the Adult South African Bantu.** *South African J. Lab. & Clin. Med.* 1956, June, v. 2, No. 2, 97–123. [60 refs.]

Institut Français d'Afrique Noire. Initiations Africaines. I. Les mammifères de l'Afrique Noire Française [Dekeyser, P. L.]. [**The Mammals of the French Territories in Africa**] 2nd edition. 426 pp., 242 figs. [Numerous refs.] 1955. Dakar.

REPORTS AND SURVEYS

Commission for Technical Co-Operation in Africa South of the Sahara. [C.C.T.A.] **Inter-African Conference on Medical Co-Operation.** 2nd Meeting. Léopoldville, 1955. 101 pp., illustrated. Reports HMC 1/2.

This publication contains the recommendations made and conclusions reached by this conference (which took place in Léopoldville in 1955) in

relation to cooperation between medical services, exchange of scientific information, standardization of methods of investigation and reporting, organization of joint projects, and relations between WHO and CCTA. These cannot be summarized; they indicate a lively realization of the need for international cooperation.

Most of the publication is taken up by a memorandum submitted by the Portuguese delegation on the standardization of methods of investigation and of reporting results in respect of the main diseases in Africa south of the Sahara. This is very detailed. It defines a number of indices (clinical index, index of human infection, index of parasite density, etc.) which can be expressed numerically, and displays a large number of symbols to be used on maps and charts to denote population, rate of infection, vectors and so on. Record cards are illustrated, and are varied according to the diseases concerned, and the text elaborates the schemes proposed for maintaining effective records. This memorandum should be studied by those who propose to make surveys of disease in Africa, and indeed in other tropical countries. *Charles Wilcocks*

Cambournac, F. J. C. & Casaca, V. R. Prospecção de endemias reinantes na área de Mulondo (Rio Cunene, Angola). [**Survey of Endemic Diseases in Mulondo, Angola**] *Anais Inst. Med. Trop.* Lisbon. 1956, Mar.–June, v. 13, Nos. 1/2, 17–25, 2 maps (1 folding).

The English summary appended to the paper is as follows:—

"The authors made a survey on the main endemics in the region of Mulondo (Cunene River, Angola) and report the methods they used and the results they obtained concerning malaria, intestinal parasitosis and vesical bilharziasis endemics, the two former being very high and the last one lower.

"They recommend some measures to be adopted for the combat of these endemics."

Cambournac, F. J. C., Gândara, A. F. & Casaca, V. R. Prospecção das endemias reinantes na área de Capelongo (Rio Cunene, Angola). [**Survey of Endemic Diseases in Capelongo, Angola**] *Anais Inst. Med. Trop.* Lisbon. 1956, Mar.–June, v. 13, Nos. 1/2, 5–15, 2 maps.

The English summary appended to the paper is as follows:—

"The authors made a survey on endemics in the region of Capelongo and Matala (Angola) and relate the methods used, the results obtained as regards endemics of malaria, the intestinal parasitosis and the vesical bilharziasis the two former being very high and the last one lower. They recommend some measures to be adopted for the combat of these endemics."

Sarmento, A. Os Huambos (subsídios para o estudo da sua antropologia física, biológica e cultural). [**The Huambo Tribe of Angola; Some Findings made during a Study of Physical Anthropological, Biological and Cultural Features**] *Anais Inst. Med. Trop.* Lisbon. 1956, Mar.–June, v. 13, Nos. 1/2, 113–68, 8 text figs. & 11 figs. on 6 pls. [47 refs.] English summary.

Sarmento, A. Unidade antropológica do Distrito do Huambo. [**Anthropological Unity in the Tribes of the Huambo Region of Angola**] *Anais Inst. Med. Trop.* Lisbon. 1956, Mar.–June, v. 13, Nos. 1/2, 169–79, 2 maps. English summary (9 lines).

BOOK REVIEWS

Macpherson, Kennie. **Mothercraft in the Tropics.** 3rd Edition. pp. xiv + 220. 1956. London: Cassell & Co., Ltd., 37/38, St. Andrew's Hill, E.C.4. [12s. 6d.]

That a third edition of this book should have appeared is evidence of its appeal. It follows on the lines of its predecessors [this *Bulletin*, 1952, v. 49, 464]. There are few major changes in the form of presentation, but some new material has been added and some modified or removed. Notable additions are up-to-date modifications of details of artificial feeding, the inclusion of notes on chiggers and veldt sore and some reference to modern drugs, including the use of piperazine [incorrectly spelt] in the treatment of threadworm infection.

The somewhat ambiguous section on the treatment and prophylaxis of malaria, referred to in the previous review [*loc. cit.*], has been replaced by a brief account of quinine treatment, with mention of the synthetic antimalarials only by name [Daraprim is spelt " duraprime " and " chloroquine, diphosphate," in the context would seem to the non-medical reader to imply two separate drugs]. There is now no reference to the important subject of personal protection against malaria.

The first part of the book, " Mothercraft ", maintains the standard of its predecessors and mothers in the tropics will find in it a host of practical information based on the author's wide experience.

The second part, " Facts a Mother Should Know " is less happy in so far as details of treatment are concerned. While the author rightly sets out accounts of general measures to deal with common ailments, there is a certain lack of evenness in their presentation. In many cases it is made clear that a doctor will be required and that treatment by the appropriate drugs or antibiotics is indicated. In others, however, no such indication

is given and, by implication, it sometimes appears that the treatment described is self-sufficient. A singularly unfortunate example is seen in the account of the treatment of gonorrhoea. Here there are prescribed antiseptic baths, dressings and the like and a brief reference to vaccines. There is not stressed the extreme importance of taking the child to a doctor as soon as possible as a matter of urgency, nor is there any indication of the rapidly successful results which he might achieve with penicillin treatment. Some of the measures set out are outmoded. For example, in the section on snake bites, it is recommended that the wound should be "cauterized" with crystals of potassium permanganate. Modern experience condemns this dangerous practice which may result in severe tissue damage. The common error has crept in of recommending a tightened ligature, without giving a warning of the imperative need to release it at frequent intervals: failure to do so may cause irreparable damage to a limb. While much of the treatment recommended is excellent the author might perhaps have been better advised to confine more of this part of the book literally to "facts a mother should know" rather than to embark upon somewhat unevenly presented therapeutic details, some of them inadequate and a few, by omission, misleading. It seems a pity that a compromise with orthodox modern therapy, however well-intentioned, should be allowed to detract from the merits of a book which is otherwise of very considerable practical value to mothers in the tropics. Some of the ambiguities and typographical errors could be remedied by more careful editing. *H. J. O'D. Burke-Gaffney*

Lapage, Geoffrey [M.D., M.Sc., M.A., M.Inst.Biol.] **Veterinary Parasitology.** pp. xvi + 964, 34 pls. & 494 figs. 1956. Edinburgh: Oliver & Boyd Ltd., Tweeddale Court. London: 39A, Welbeck Street, W.1. [63s.]

The publication of this book serves to remind one of the wide field covered by the title Veterinary Parasitology. Indeed, one rather fears that the unfortunate veterinary student may soon be expected to become a parasitologist, if not a protoozoologist and entomologist, on his way to obtaining the necessary qualification so that he may practice his profession. The immediate reaction of the reviewer is one of congratulation to the author, whose extensive experience and labour have enabled him to produce in one volume this mass of knowledge relating to the subject of parasitism.

An attractive feature of the work is the very desirable combination of the zoological accounts of the various phyla with the pathological and epidemiological features of each species, together with modern methods of control and estimates of economic importance—a picture which is necessary for the scientific and intelligent application of the knowledge set forth.

The first two chapters discuss in general terms parasitism and parasitology and serve to form a useful basis for the detailed accounts of the various phyla and species which follow. Although the book is stated to be "about the parasitic animals that cause diseases of British farm stock" quite a proportion of the work is devoted to parasites which only occur in the tropics and one wonders in view of the vast field of veterinary parasitology and the more specialized knowledge and application which is nowadays required, whether the tropical part of this subject does not warrant separate consideration in a book of its own.

While the introduction covers the fundamentals of the whole subject there is a tendency to over-simplify some of the phenomena of the effects and reactions of parasitism, as for instance the statement that the blood vessels of a horse may become blocked by dead trypanosomes after treatment.

The helminthological section of the book covers some 328 pages. It is well illustrated and the life histories and anatomical features are set out in a simple manner which should make identification easy, while paragraphs on the effects on the host and the control of the parasitism together should enable practical measures against any particular helminth to be applied on a sound basis.

The phylum Arthropoda occupies rather more space and covers several very important classes, orders and suborders; much of the information relates to tropical as well as temperate climatic environment. This particular section of the book, in the reviewer's opinion, covers a wide field in a very efficient and compact manner and the various genera of Diptera, mites, ticks, etc., should be easily identified and their control planned and practical importance recognized. It is difficult to deal with the whole subject of tsetse flies in a matter of 8 pages and the value of this chapter on *Glossina* has suffered from this condensation, while some of the statements concerning the tsetse flies require reconsideration.

The remainder of the book is taken up with the Protozoa and extends to some 187 pages. There is an adequate general description of the phylum followed by more detailed consideration of the various classes, orders, etc. Again quite a proportion of this section is devoted to tropical parasites of which the Trypanosomidae *Leishmania* and the Haemosporidia are the most important. The trypanosomes, including classification, life history, pathology, chemotherapy and control, are dealt with in some 16 pages and while this arrangement gives an interesting overall picture, it tends possibly to over-simplify this complicated subject.

The illustrations are good and the life history and host relationship charts are easy to follow. The book should prove useful for reference to the practising veterinary surgeon in both temperate and tropical countries, while as a text-book it will fill a gap in the library of veterinary, agricultural and biology students. The printing is clear and the extensive bibliography most valuable for those who wish to study further any particular subject. Possibly it would have been an improvement to have

divided the bibliography and put the appropriate sections at the conclusion of each part of the book but this is a minor point. Only one obvious misprint was noticed—" water hog ", page 778, should, of course, read " wart-hog ". *J. Carmichael*

Sawitz, William G. [M.D.] **Medical Parasitology. For Medical Students and Practicing Physicians.** 2nd Edition. pp. ix + 342, 89 figs. (1 coloured). 1956. New York. Toronto. London: McGraw-Hill Book Co., Inc., McGraw-Hill House, 95, Farringdon Street, E.C.4. [45s.]

The second edition of Dr. Sawitz's *Medical Parasitology* is subdivided into sections dealing successively with protozoa, helminths and arthropods of medical importance, and with the treatment of the infections described. A short synopsis and a chapter on laboratory techniques follow, and the book concludes with a glossary giving the derivations of the various scientific names and expressions used in the text.

The author has achieved the difficult task of presenting an accurate and concise account of the protozoa and helminths; but he must be judged to have failed in the case of the arthropods, for the extensive and difficult subject of medical entomology is hardly susceptible of condensation to the degree attempted here, and is surely deserving of a book to itself. Nevertheless, apart from the section on arthropods, there is little to be adversely criticized. No mention is made of a rapid method of staining thick films for malaria parasites, dilute Giemsa being the recommended stain for the purpose. Field's stain, though less fool-proof, has the great advantage of extreme speed and is for that reason to be preferred. Perhaps in the next edition a few lines could be found for *Dipetalonema streptocerca*, which may be rather more pathogenic than has been believed in the past. The section on treatment summarizes current American practice, and British readers may be a little surprised to find no mention of proguanil as a prophylactic drug (Daraprim [pyrimethamine] is recommended). Potassium antimonyl tartrate is advised for schistosomiasis, rather than the less toxic sodium salt.

The production of the book conforms to the high standard associated with the publishers. *D. R. Seaton*

Encyclopédie Médico-Chirurgicale. 1956. Recueil No. 5, Cahier 33, loose leaf pp., numerous figs. [Numerous refs.] **Maladies infectieuses** [Debré, R. (Edited by)]. **Maladies parasitaires** [Galliard, H. (Edited by)]. Paris VI^{e}: Éditions Techniques S.A., 18, rue Séguier.

The 33rd *cahier* of this publication [see also this *Bulletin*, 1955, v. 52, 1029, 1252] contains sections on accidents due to antibiotics from fungi (P. Royer and J.-C. Job), whooping cough (J. Marie and E. Eliachar),

tetanus (J. Paraf and A. Paraf), infectious lymphocytosis (R. Debré, P. Grenet and G. Mathé), parasitic diseases (H. Galliard), and diseases due to cestodes (J. Lapierre). The arrangement of information within the sections is clearly marked and easy to follow; each, in fact, is an up-to-date essay on its subject, containing information on such matters as history, aetiology, clinical features, diagnosis, treatment, etc. There are many good line and half-tone illustrations, which are well reproduced on the excellent paper on which the sections are printed. Some of the illustrations are in colour. The sections contain short bibliographies of relevant literature.

The sections are published in a form ready to be bound up with earlier sections; the encyclopaedia itself, now in its 27th year, must form a most useful collection of modern information, constantly renewed.

Charles Wilcocks

Encyclopédie Médico-Chirurgicale. 1956. Recueil No. 25, Cahier 34, loose leaf pp., numerous figs. [Numerous refs.] **Maladies infectieuses** [Debré, R. (Edited by)]. **Maladies parasitaires** [Galliard, H. (Edited by)]. Paris VI^{e}: Éditions Techniques S.A., 18, rue Séguier.

This *cahier* continues the series of chapters (or essays) published in loose-leaf form, each giving a brief self-contained account of the subject with which it deals [see above, p. 1499]. In this system it is possible to substitute pages containing more recent information for those which have become out of date, and in the present *cahier* a number of such pages of revised or expanded information are provided.

The main sections relate to Prophylaxis of Infective Diseases (Professor J. Boyer), Typhoid and Paratyphoid Fevers (Professor H. Baylon and Dr. R. Hugonot), Prognosis of Brucellosis (Professor M. Janbon), Treatment of Amoebiasis (Dr. J. Lapierre), and Cutaneous and Mucocutaneous Leishmaniasis (Professor N. Ansari).

Most of the sections, besides dealing in a systematic way with the subjects, end with lists of references which must be helpful for further reading. This publication is a useful and competent compilation.

Charles Wilcocks

Printed in Great Britain under the authority of Her Majesty's Stationery Office
by The Eastern Press, Ltd., London and Reading.

(2205) Wt. P8523/477 11/56 E.P. Ltd. Gp. 566.

INDEX OF AUTHORS OR SOURCES

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Page numbers within brackets indicate papers not summarized.)

Am.	signifies	Amoebiasis and Intestinal Protozoal Infections.	Lep.	signifies	Leprosy.
Bart.	,,	Bartonellosis.	Mal.	,,	Malaria.
Bl.	,,	Blackwater Fever.	Misc. Dis.	,,	Miscellaneous Diseases.
B.R.	,,	Book Review.	Misc. Pap.	,,	Miscellaneous Papers.
Chl.	,,	Cholera.	Oph.	,,	Tropical Ophthalmology.
Def. Dis.	,,	Deficiency Diseases.	Parasit.	,,	Parasitology: General.
Den.	,,	Dengue and Allied Fevers.	Pl.	,,	Plague.
Der.	,,	Dermatology and Fungus Diseases.	Rab.	,,	Rabies.
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Ep. Dropsy	,,	Epidemic Dropsy.	Reports, etc.	,,	Reports and Surveys.
Haem.	,,	Haematology.	Sp.	,,	Sprue.
Heat Str.	,,	Heat Stroke and Allied Conditions.	Tox.	,,	Toxoplasmosis.
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			Vms.	,,	Venoms and Antivenenes.
			Y.F.	,,	Yellow Fever.
			Ys.	,,	Yaws.

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Printed in Great Britain under the authority of HER MAJESTY'S STATIONERY OFFICE
by The Eastern Press, Ltd., London and Reading

(2740) Wt. P68186/514 12/58 E.P. Ltd. Gp. 566.